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PIT AND QUARRY

DEC 22 1941

NOVEMBER, 1941

Doubling the Output of Rotary Lime Kilns . . . Hard-Surfacing Saves Money for Slag Producer
How Insoluble Residues in Cement Affect Concrete . . . Smaller Plants Supplement Main Quarry

LUDLOW-SAYLOR

CONTROLLED-TEMPER SUPER-LOY WOVEN WIRE SCREENS

for super-severe service

●

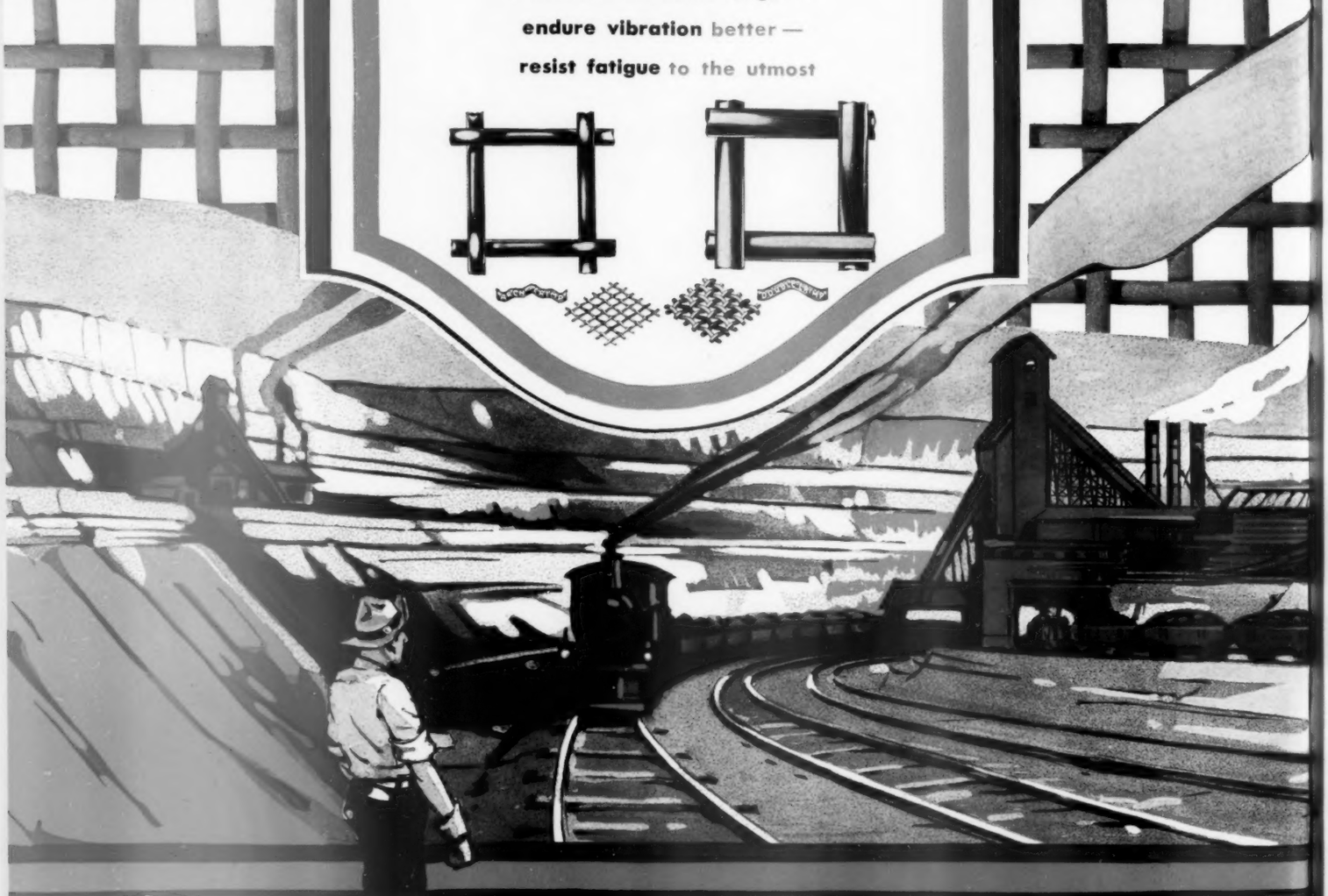
SUPER-HARD, SUPER-TOUGH, SUPER-STRONG

CONTROLLED-TEMPER SUPER-LOY WOVEN WIRE SCREENS

withstand abrasion longer—

endure vibration better—

resist fatigue to the utmost



The background at top of page shows the "Perfect" Double-Crimp Weave.

The small cuts in the center panel compare Arch-Crimp Weave and Double-Crimp Weave.

The border at foot of page shows "Perfect" Double-Crimp Steel Wire Cloth which has been hot-dip galvanized after weaving.

Samples on request.

The LUDLOW-SAYLOR WIRE COMPANY SAINT LOUIS

Handling Materials for DEFENSE INDUSTRIES

EASTON is building the following types of equipment to meet the material handling requirements of all industries directly or indirectly engaged in defense work:

INDUSTRIAL CARS
for hand or locomotive haul, or electric

INDUSTRIAL TRAILERS AND SEMI-TRAILERS
for hand, tractor or motor-truck haul

ELECTRIC TRUCKS
load-carriers, low-lifts and tier-lifts

DUMP BODIES • TURNTABLES • ACCESSORY EQUIPMENT

COUNSEL FOR DEFENSE—Because of our heavy backlog of defense work, Easton Sales Engineers have more free time to give you. Their practical surveys may show you the way to immediate speed-ups, may help you to get better service from old equipment, or may assist in locating serviceable equipment. Write to Engineering Counsel, Easton Car & Construction Company.

EASTON

EASTON CAR & CONSTRUCTION COMPANY • EASTON, PA.

PIT AND QUARRY, November, 1941, Vol. 34, No. 5. Published monthly by the Complete Service Publishing Company, 538 South Clark Street, Chicago, Ill. Subscription price $1 for 1 year in the U. S. and possessions, Canada, Central and South America; elsewhere $1 additional for each year. Single copies 25 cents. Entered as second-class matter February 28, 1932, at the Post Office at Chicago, Ill., under the Act of March 3, 1897.

NEARLY SIX YEARS ON A *Crusher*

. . . and coming up for more!

WE don't have to tell you that a crusher drive is tough. So when a 36" machine was installed by a West Coast sand and gravel company, they wanted belting that could stand the gaff.

As usual, conditions were not ideal. There was a high starting load, along with an alternate wet and *dry* condition—all of which figure to give any belt a beating. Upon recommendation of the G.T.M.—Goodyear Technical Man—the company installed a pivoted motor base equipped with a truly endless Goodyear COMPASS "40."

That was nearly six years ago. Since that time the belt has not required a moment's attention for repair or maintenance. There has been practically no stretch. And today it is still giving A-1 service.

If you'd like that kind of service on your belt-killing drives, the G.T.M. is the man to see. To bring him, write Goodyear, Akron, Ohio, or Los Angeles, California—or phone the nearest Goodyear Mechanical Rubber Goods Distributor.

THE GREATEST NAME IN RUBBER
GOODYEAR

Compass—T. M. The Goodyear Tire & Rubber Company

All LORAIN SHOVELS

QUALIFY FOR QUARRY SERVICE

IN DESIGN... Pick any unit at random from the ⅜ to 2½-yd. Lorain line and you've got a quarry shovel. Every one is built to Center Drive design for direct-to-the-point power application; maximum working capacities per pound of weight; and simplified construction using fewer and stronger parts. Add heavy-duty, welded steel shovel boom and stick, rugged crawler, and a host of time and maintenance-saving features and you have every qualification for a well-rounded rock shovel.

AND PERFORMANCE... Illustrated here are 3 of the 4 Lorain shovels purchased by Nally & Mudd for quarry service. The two units in the upper right are ¾-yd. Diesel Lorain-40A's and have moved 385,000 tons to date from this Kentucky quarry. Both work 16 hours a day, produce an average of 2000 tons each daily. The unit at lower left is a new 1¼-yd. Diesel Lorain-70. It works 10 hours daily, moves about 30,000 yds. per month, mostly stripping overburden.

Write today for catalogs describing these ⅜ to 2½-yd. quarry shovels

THE THEW SHOVEL COMPANY
LORAIN, OHIO

THEW CENTER DRIVE
REG. U.S. PAT. OFF.

3/8 to 2 1/2-YD. LORAINS

Ford

More Than Ever Before AMERICA'S ECONOMY TRUCK!

The RIGHT Chassis + **The RIGHT Body** + **The RIGHT Engine** = **The RIGHT TRUCK**

6 DIFFERENT WHEELBASES

126 CHASSIS AND BODY COMBINATIONS

4 DIFFERENT ENGINES

For Today's Tough Job!

FORD ENGINE AND PARTS EXCHANGE PLAN

Will Keep 'Em Rolling Through the Hard Truck Days Ahead

• As a plus value when you buy a Ford Truck, you receive the benefits of a plan that extends the life of your truck far beyond the many thousands of miles you normally expect it to serve. Under this Ford Engine and Parts Exchange Plan, many vital parts, including the engine itself, may be exchanged, when necessary, at minimum cost and without loss of valuable time. Ask your Ford dealer for details of this service that means *extra* savings to you!

FORD MOTOR COMPANY

Builders of Ford and Mercury Cars, Ford Trucks, Commercial Cars, Station Wagons, Transit Buses

THE NEW Ford Trucks meet more than 95% of all hauling requirements and save money in mile after mile of dependable, trouble-free operation. Truck-built from the inside out—with extra strength at all critical points—low-cost Ford Trucks are the big dollar value for 1942! You have the option of six wheelbases plus 126 Ford-built chassis and body combinations. Four great engines—the 90 hp or 100 hp V-8, the new 90 hp "6", and the super-economy "4"—offer you the most flexible power-range in the entire truck field. All the proved Ford economies . . . low first cost, low operating cost, low maintenance cost . . . are yours in a truck that's *right* for these times, *right* for your job! See the new Ford Trucks—learn for yourself why they're the best and toughest ever to bear the Ford name!

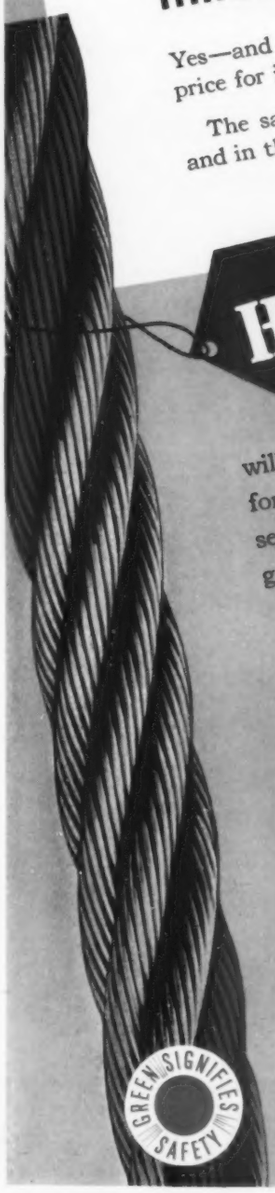
In these days . . .

would you buy a gasoline that would give you twice the mileage and power—?

Yes—and you would be glad to pay a premium price for it, too.

The same logic would apply to wire rope—and in that connection we offer—

HAZARD LAY-SET *Preformed*



● *Invariably*, Hazard LAY-SET Preformed will give far better and longer service, when compared with non-preformed rope. In many instances it has given much more than twice the service. The result is fewer machine shutdowns, steadier production, greater efficiency.

It is the preforming process which LAY-SET goes through at the mill that makes possible this superior service. Preforming relaxes the wires—relieves them of pent-up stresses—gives the rope extreme resistance to bending fatigue. It makes LAY-SET resist kinking and twisting; makes it easier, faster and safer to handle. It obviates the necessity for seizing the ends when being cut.

For longer and better rope service, for less "outage time" for machines and men, for greater safety to workmen—specify Hazard LAY-SET Preformed. All Hazard ropes identified by the Green Strand are made of Improved Plow Steel.

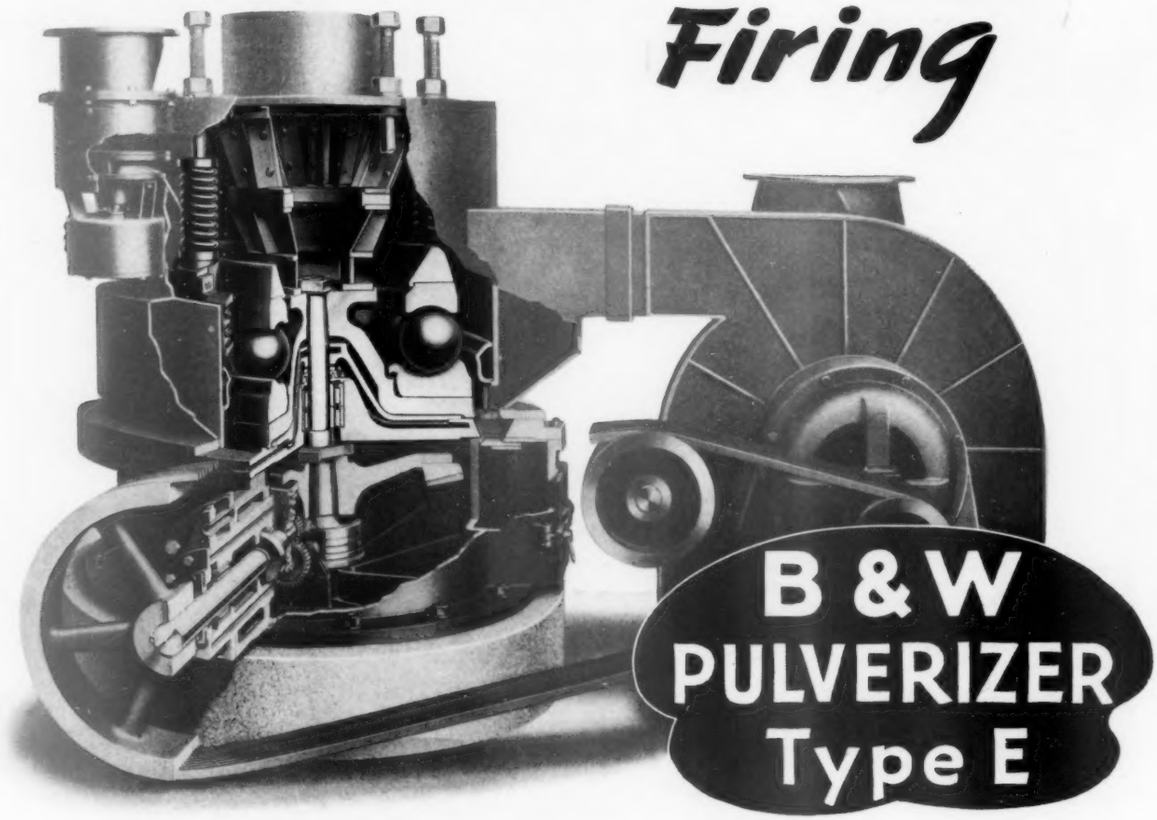
HAZARD WIRE ROPE DIVISION • WILKES-BARRE, PENNSYLVANIA

Established 1846

AMERICAN CHAIN & CABLE COMPANY, INC.

District Offices: New York, Chicago, Philadelphia, Pittsburgh, Fort Worth, San Francisco, Denver, Los Angeles, Atlanta, Tacoma

The LEADING PULVERIZER for Direct Firing



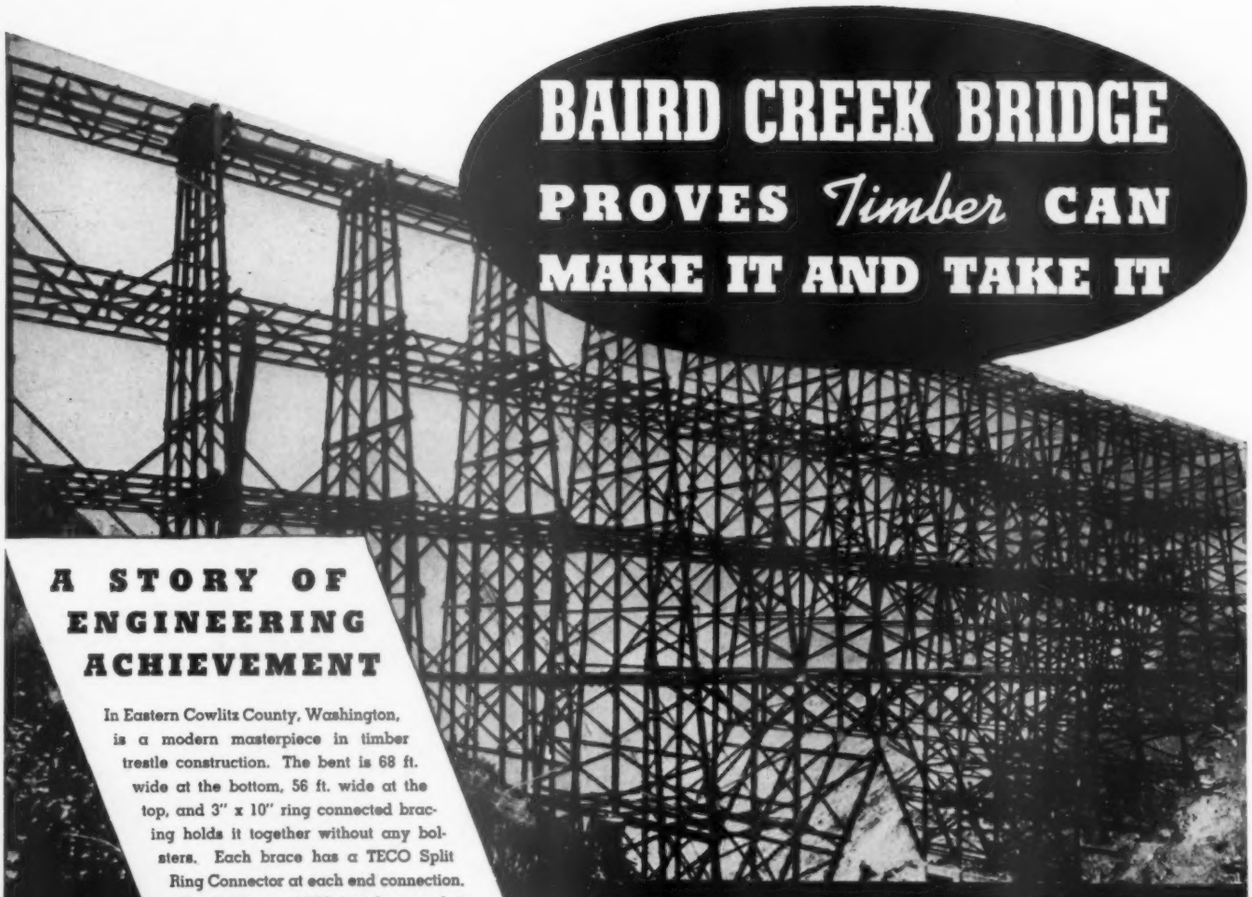
Successful direct firing of rotary cement kilns was developed by Babcock & Wilcox in 1932. Today, 97 cement kilns are direct-fired with B&W pulverizers. This is 44 per cent of all the direct-fired cement kilns now in service.

The modern pulverizer for economical direct firing is the B&W Pulverizer, Type E, illustrated on this page. The Type E mill employs the ball-bearing principle of grinding—used successfully in more than 700 installations.

THE BABCOCK & WILCOX COMPANY
85 Liberty Street **New York, N. Y.**

C-42

BABCOCK & WILCOX



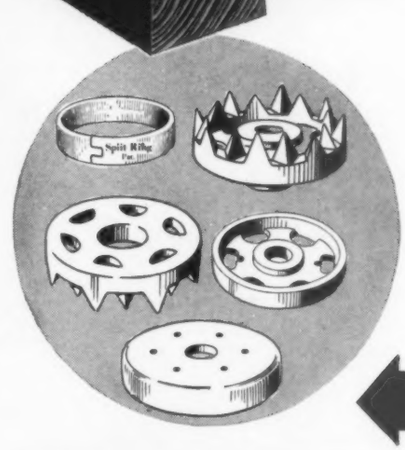
BAIRD CREEK BRIDGE PROVES *Timber* CAN MAKE IT AND TAKE IT

A STORY OF ENGINEERING ACHIEVEMENT

In Eastern Cowlitz County, Washington, is a modern masterpiece in timber trestle construction. The bent is 68 ft. wide at the bottom, 56 ft. wide at the top, and 3" x 10" ring connected bracing holds it together without any bolsters. Each brace has a TECO Split Ring Connector at each end connection. The bridge is 1,130 feet long and its rail height at the center point is 235 feet above the creek bed.

TECO Connectors are being used today in Roof Trusses, Overhead Cranes, Timber Bents, Trestles, Piers, Pier Foundations, Coal Pockets, Auto Loading Docks, Bridge Decks, Coaling Towers, and for many other types of construction.

TECO CONNECTORS gave the full strength of *Timber* to this TOUGH JOB



TECO Ring Connectors spread the load on a timber joint over practically the entire cross-section of the wood.

TECO Timber Connectors introduce a new technique to engineering. Because they relieve stress on timber joints by enlarging the bearing area, developing the full stamina of timber, they open many new fields to the basic economy of timber construction. Old-style plates, angles, and straps are eliminated; construction costs and maintenance expense are reduced.

TECO Timber Connectors are used today wherever enduring feats of engineering are being done. Mail the coupon now for complete technical details.

TIMBER ENGINEERING COMPANY INC.

DEPT. AK-11, 1337 CONNECTICUT AVENUE

WASHINGTON, D. C.

Timber Engineering Co., Inc., Dept. AK-11,
1337 Connecticut Ave., Washington, D. C.

Please send us full technical information on the new design opportunities in timber made possible through the development of the Teco Connector System.

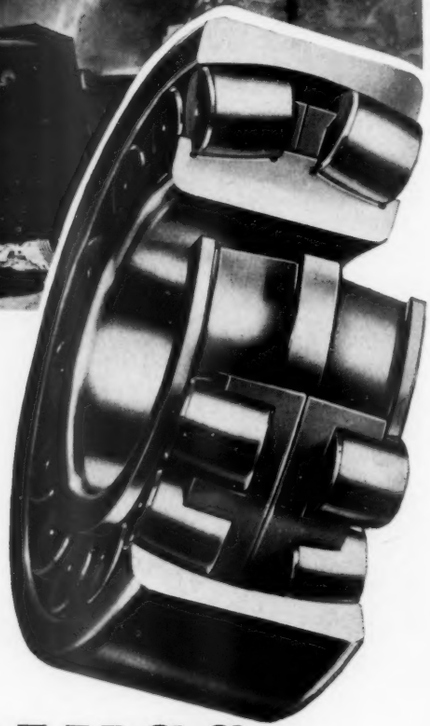
Individual.....

Firm.....

Street.....

City..... State.....

BUILT BY NORTHWEST ENGINEERING CO., *this 2½-yard shovel depends on SKF Bearings on the drum shaft.*



Moving rock quickly

ON SKF BEARINGS

Keeping the drum shaft of this Northwest 2½-yard shovel in proper position is no swivel arm sinecure for a bearing, not even an SKF. Here SKF's meet vibration, shock, and consequent shaft deflections, distortions or weave with self-aligning characteristics that enable them to maintain full load carrying capacity without binding. Consequently, there's no bearing trouble as the drum hoists main operating cables that pass over the boom sheave to the dipper . . . and adjusts the "stick" as it weaves back and forth. To a quarry man, that means "Performance" in any language. 4915

SKF INDUSTRIES, INC., FRONT ST. & ERIE AVE., PHILA., PA.

ROLLER SKF BEARINGS

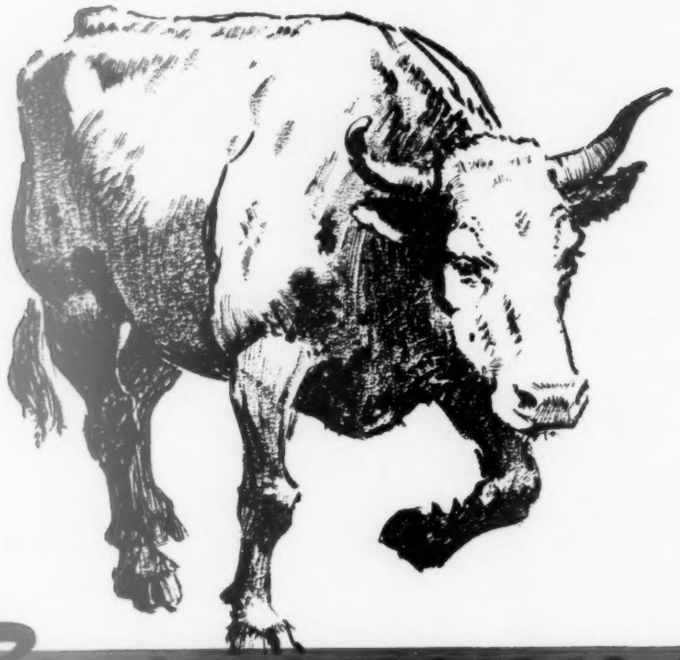
IT'S FULL SPEED AHEAD For National Defense when MARION SHOVELS Are on The JOB!!

★ For quarries, sand and gravel plants to measure up to the heavy raw material demands national defense has placed on them, material handling equipment must be equal to the task. MARION shovels, draglines and clamshells are demonstrating every day that they have the necessary speed, stamina, low cost operation and dependability so essential to keep defense schedules moving. This is because MARION shovels are built with the heaviest kind of rock digging in mind, and MARION draglines and clamshells with the extra strength to handle top loads continuously. » » »

MARION

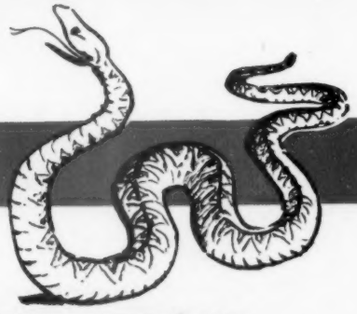
SHOVELS • CLAMSHELLS • WALKERS
DRAGLINES • CRANES • PULL-SHOVELS
From ¾ cu. yd. to 35 cu. yds.
Gasoline • Diesel • Electric

THE MARION STEAM SHOVEL CO., Marion, Ohio, U. S. A.



STRONG AS AN OX. . . .

but supple too

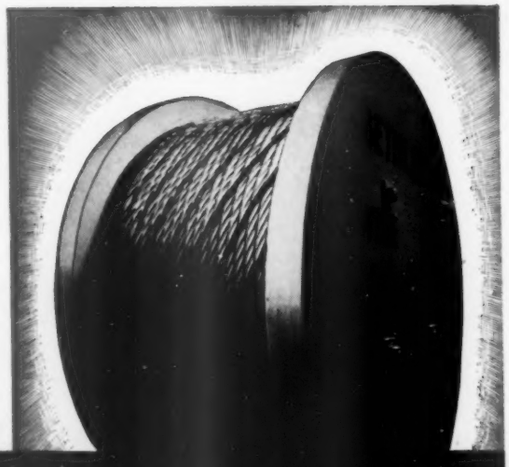


PURPLE STRAND
FORM-SET
WIRE ROPE

Rugged strength and smooth, easy handling get together in Purple Strand Form-set wire rope.

The Purple Strand means that the rope is 100 per cent Improved Plow Steel, the strongest, toughest steel used in making wire rope. The Form-set (pre-formed) construction means that the rope is easy to handle, won't wicker, spools smoother, is more resistant to bending fatigue.

Next time you buy wire rope for a hard-running job . . . look for the Purple Strand, and then say "Form-set." You'll be getting a combination of strength and ease ot handling that's hard to beat.

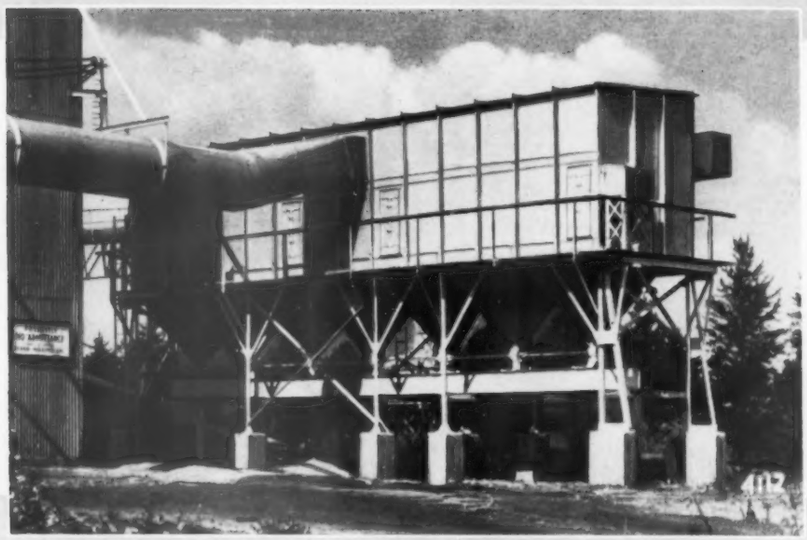


BETHLEHEM STEEL

BETHLEHEM STEEL COMPANY

• An Aid to Greater Production

SLY DUST CONTROL



Sly Dust Control at the Staso Milling Co., Pembine, Wis., producers of granulated roofing stone.

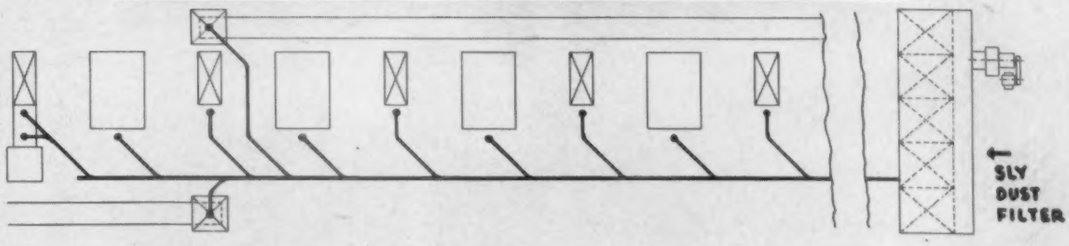


Diagram of connection of Sly Dust Filter with various sources of dust—crushers, screens, conveyors and elevators. At these points dust-laden air enters hoods and is drawn through piping to the filter—dust filtered out and easily disposed of.

In these days of high-speed production, Sly Dust Filters are of vital aid in making cleaner plants, helping maintain quality of product, saving maintenance costs, and protecting health and safety of employees.

Exclusive advantages in Sly Dust Filters:

(1) Greater filtering capacity because of more filtering cloth.

(2) Taut bags at all times, saving power and resulting in quicker removal of dust.

(3) Bags more easily replaced.

(4) Automatic control (any degree) minimizing or removing the human factor.

(5) Simpler shaker mechanism resulting in savings in maintenance and operation.

Whatever your dust problem, write us. Sly engineers are experienced with all kinds of industrial dusts. We shall be glad to tell you what advantages you, too, can realize, and give you full particulars.

That the advantages of Sly Dust Filters—their savings in space, power, and maintenance—are widely appreciated in the Cement Industry is evident from the fact that Sly is a 4 to 1 favorite in this industry.

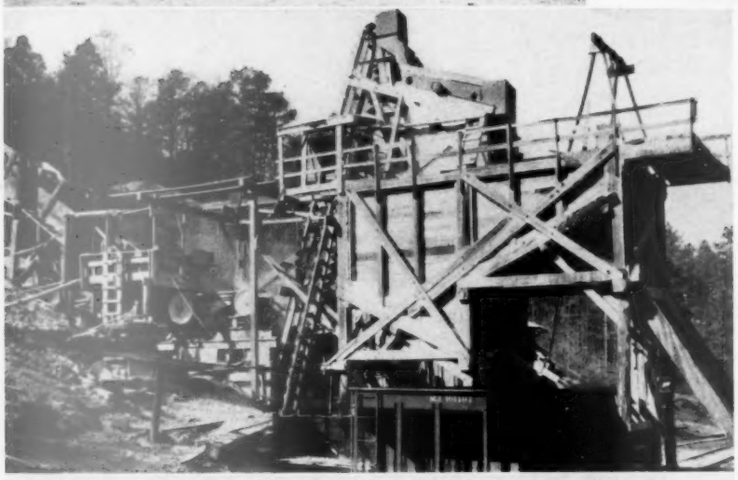
THE W. W. SLY MANUFACTURING CO.

Branch Offices in Principal Cities

4745 Train Ave., Cleveland, Ohio

SLY
INDUSTRIAL DUST CONTROL

We've got the right layout for your quarry or pit!



Universal builds jaw and roll crushers, pulverizers, conveyors, elevators, hoppers, bins—everything that goes to make up a stationary or portable rock or gravel crushing, screening and loading plant.

Tell us the conditions in your deposit and the materials you wish to produce and we will recommend the ideal plant layout that will insure you of maximum output and the greatest possible profit with a minimum of equipment.

Standard inter-related units can be readily assembled to produce a plant just suited to your conditions. And when you move to new "diggings", it's simple to install a larger crusher, an extra conveyor or whatever is needed to convert your plant to meet new requirements. You'll always find Universal helpful in planning the new layout so that you will get the most out of it!

There's a progressive, capable Universal Crusher Company Sales-Servicenter near you! Dealers in key centers throughout the hemisphere.

Get the full facts on the profit-proved Universal Line today!

UNIVERSAL CRUSHER COMPANY
619 C AVE. WEST CEDAR RAPIDS, IOWA

UNIVERSAL

CRUSHERS, PULVERIZERS, COMPLETE PLANTS, SPREADEROLLERS, PORTABLE ASPHALT PLANTS

How LeTourneau Carryall Stripping Method
SPEEDS ALUMINUM OUTPUT

To speed output of bauxite for America's aluminum supply, a fleet of 8 LeTourneau Carryall Scrapers is stripping 2,000,000 yards of overburden from this Arkansas bauxite property, largest operation of its kind in the country.

Stripping 20 Hours a Day

The stripping contractor is keeping the Carryalls working day and night, moving sand, clay and gravel, which in some places range over 100 feet deep. Despite the soft, damp material, the FP Carryalls pulled by "Caterpillar" D8 tractors, are pusher loaded to 18 yards heaped capacity in 1.25 to 1.50 minutes.

Carryalls Make 3,000-Foot Round Trip Every 11 Minutes

Large, easy-hauling Carryall tires enable the tractor-Scraper rigs to bring heaping loads out of the soft pit, haul up varying adverse grades up to 12% (averaging 8%) . . . to make 3,000-foot round trips every 11 minutes. This includes loading, hauling and dumping time. Other than a LeTourneau Angledozer and three pusher tractors used in the pit, no extra stripping equipment is used . . . or needed. That's handling a big stripping job with a minimum investment!

Like this smart stripping contractor . . . and scores of other successful mining outfits, both large and small . . . you'll find LeTourneau stripping and materials-handling equipment can lower your costs and speed production. If you have clearing, stripping, stockpiling, roadbuilding, materials hauling, etc., it will pay you to see your LeTourneau-"Caterpillar" dealer about this modern LeTourneau mining method. See him TODAY!

Rolling 18 heaped yards up a 12% stretch of grade. The Carryall's big rubber tires make it an easier pull for the "Caterpillar" D8 tractor. Note clean-cut condition of the bank, pit and haul road—a typical Carryall Scraper-handled job!

For Low Cost Stripping

CARRYALL* SCRAPERS, ANGLEDOZERS*, BULLDOZERS, ROOTERS, POWER CONTROL UNITS, TRACTOR CRANES, PUSHDOZERS, SHEEP'S FOOT ROLLERS, TOURNAPULLS*, TOURNATRAILERS*, TOURNACRANE.

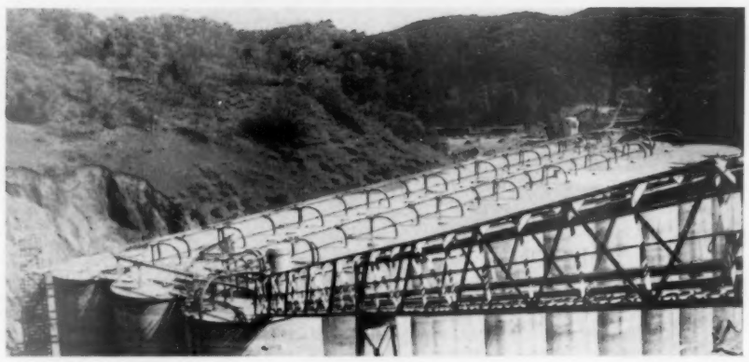
***Name Reg. U. S. Pat. Off.**

CABLE ADDRESS: "BOBLETORNO"

LETOURNEAU

PEORIA, ILLINOIS • STOCKTON, CALIFORNIA

Clean, Safe, Silent Conveying . . .



THE FULLER-KINYON SYSTEM

The fewer moving parts that make up any piece of equipment, the more continuous service at the lowest operating cost. The Fuller-Kinyon Conveying System is an outstanding example of simplicity of design . . . one moving part . . the screw in the pump.

This screw is so constructed that it will withstand exceedingly severe service and, after long, gruelling operation, if repairs become necessary, the machine is so designed that the screw can easily be removed and replacement made in a very short time.

The conveying lines consist of standard steel pipe . . . no mechanical parts such as links, buckets, screws or drags. Nothing moves but the material and air.

Photograph above, taken during construction, shows an installation of Portland cement silos. Two main conveying lines carry the cement from the finishing mills to storage silos and bins. Distribution is made from the main lines to 52 delivery points. Compare this clean-cut, simple layout of pipe lines with a mechanical system to make the same distribution and delivery.

When you install a Fuller-Kinyon System you install a permanent system, one that will last a lifetime with the least possible repairs.

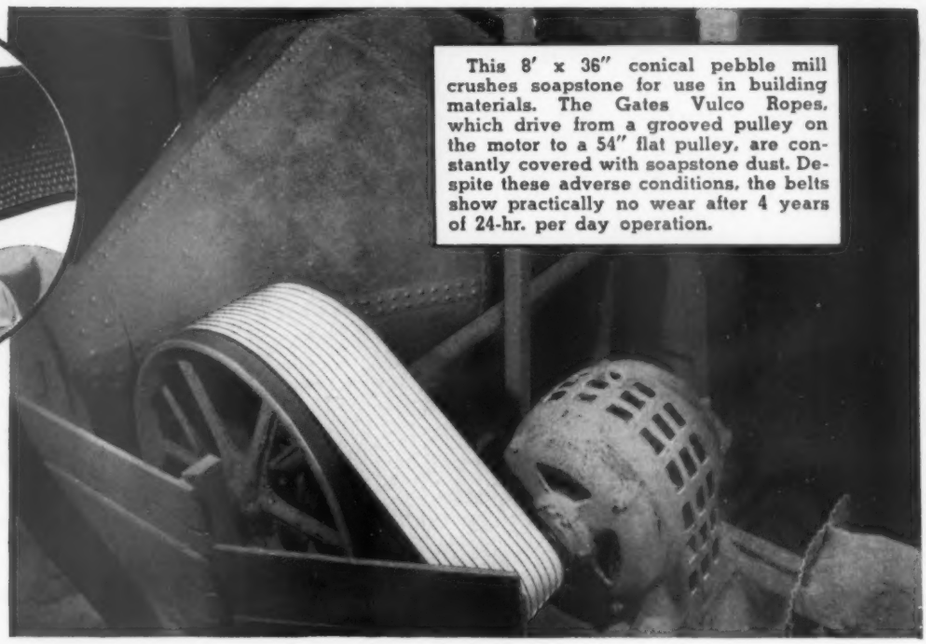
FULLER COMPANY

CATASAUQUA, PENNSYLVANIA

Chicago: 1144 Marquette Bldg.
San Francisco: 320-321 Chancery Bldg.

P-50

FULLER-KINYON, FLUXO, AND AIRVEYOR CONVEYING SYSTEMS · · · · ROTARY FEEDERS AND DISCHARGE GATES
ROTARY AIR COMPRESSORS AND VACUUM PUMPS · · · · AIR-QUENCHING COOLERS · · · · BIN SIGNALS



This 8' x 36" conical pebble mill crushes soapstone for use in building materials. The Gates Vulco Ropes, which drive from a grooved pulley on the motor to a 54" flat pulley, are constantly covered with soapstone dust. Despite these adverse conditions, the belts show practically no wear after 4 years of 24-hr. per day operation.

Feel a Bending V-Belt Change Shape

Learn How The

CONCAVE SIDE

Saves You Many Dollars in Belt Costs!

What Happens When a V-Belt Bends

FIG. 1

FIG. 2

Here's a simple test that takes two minutes—and it will save you many dollars:—

Have someone bend a V-Belt exactly as it bends in going around its pulley. As it bends, grip its sides with your fingers. You will *feel* those sides *change shape*. If the sides were straight before bending, they become *convex* as the belt bends. (See Figure 1 on the left.) Note how the sides bulge *out*.

Now try the same test with a belt which has the patented concave side. You will feel the *same shape change*—but what a *different result!* The sides do not become *convex*. They become perfectly straight. The bent belt has a shape that exactly fits its sheave groove—as shown in Figure 2.

Two big savings result. *First*—There is no side-bulge and this means uniform side-wall wear—*longer life! Second*—There is a full side-width grip on the pulley and this carries heavier loads without slippage—saving the belts and also saving your *power!*

The concave side is a Gates patent. Only belts built by Gates are built with the concave side.

THE GATES RUBBER COMPANY

Engineering Offices and Stocks in All Large Industrial Centers

GATES VULCO ROPE DRIVES

VANCOUVER
H. D. Layfield & Company
1212 Hamilton Street

WINNIPEG
Manitoba Bridge & Iron Works

TORONTO
George W. Tindall
108 Lombard Street

15 Seconds for loading or dumping

Unit fits any standard chassis

When Time is Invaluable The BROOKS Load Lugger is Indispensable

Clear space for miscellaneous hauling when bucket is not in use

TODAY'S blitz-pace of production demands fast, automatic equipment that will save man-hours and speed up the movement of material.

●

Brooks LOAD LUGGER is built for this purpose . . . and thousands of LOAD LUGGERS are doing a great job for Uncle Sam and American Industry.

●

Truck efficiency is increased, because *one* Load-Lugger-equipped truck, operating with 5 to 10 dump buckets, can handle as much material as a fleet of ordinary trucks.

●

Man-power is saved because the work of loading low, sloping-side buckets on the ground is much easier than shoveling over high truck boards.

●

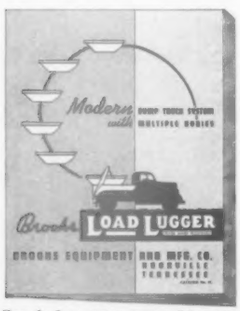
It is the simplest, most fool-proof unit on the market. No rolls, no cable, no gadgets to get out of order. No counterweights needed, as the patented jackleg support prevents front end buck-ups when a heavy load is hoisted. Low headroom, easy control.

●

LOAD LUGGERS belong on every job where hand loading is required:—

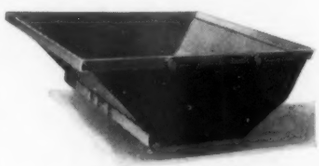
Quarry operations . . . feeding crushers . . . construction work . . . road building . . . snow removal . . . material handling jobs in defense work or industrial projects.

JACK-LEG SUPPORT relieves strain on truck when overhanging load is raised



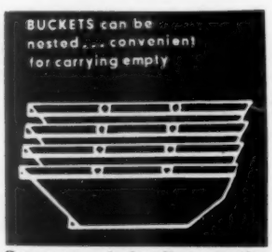
Send for our new 16-page Catalog

Tilt type Bucket



Skip type Bucket capacities 1½ to 4 cu. yds.

ONE PIECE CONSTRUCTION, CONTINUOUS WELDED, AND REINFORCED, LEAK-PROOF BUCKET.



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Air Separators

The STRONGEST LINK

in *Fine Sizing*

Write for Bulletins describing STURTEVANT equipment in complete detail.

302

Sturtevant Air Separators now in use in the cement industry alone. All were accepted on approval, none rejected.

Modern sizing practice recognizes the STURTEVANT Centrifugal Air Separator as the *indispensable* link in the chain of material classification.

This machine is a guaranty of fine products ranging from 40-mesh to 350-mesh and micron sizes.

It features perfectly controlled particle size and specific surface area, lower temperature, and maximum uniformity of material.

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YOU'RE dollars ahead WITH "CATERPILLAR" DIESEL POWER

(A) GRAVEL PLANT. Near Southland, Texas, the "Caterpillar" Diesel D13000 Engine at left drives the Pioneer plant below for the Quitaque Sand & Gravel Co. Operates 12 hours a day, using about 4 gals. of 5c fuel per hour.

(B) COMPRESSOR. This "Caterpillar" Diesel D13000 Engine drives an Ingersoll Rand air compressor for the Burkeville (Va.) Stone Corp. Operates 10 hrs. a day on quarry work, using about 4 gals. of low-cost fuel per hour.

(C) SHOVEL. A "Caterpillar" Diesel D13000 Engine powers this Koehring 1½-yard shovel handling rock for the Pickens Quarries near Plattsmouth, Neb. Working 9 hrs. a day, engine consumes about 4 gals. of 7½c fuel per hour.

★ **QUALITY.** With "Caterpillar" Diesels running your equipment, you're ahead from the start—through the outstanding value your dollars buy in the high-grade materials, proved design and precision manufacture with which these world-famous power units are constructed.

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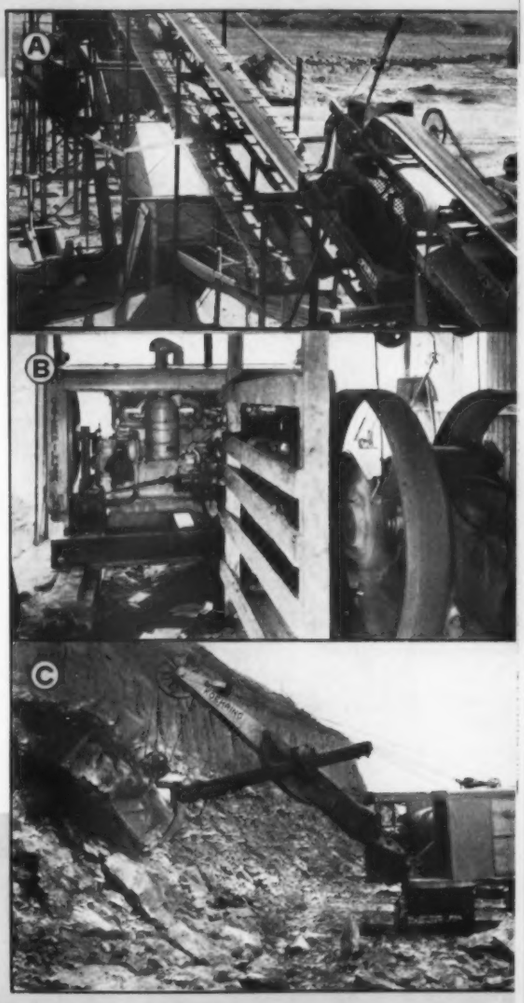
PEORIA ILLINOIS

IMPORTANT TO DEFENSE — *"Caterpillar" Diesel equipment is widely active — speeding the production of rock, gravel, sand and other raw materials essential to defense.*



CATERPILLAR Diesel

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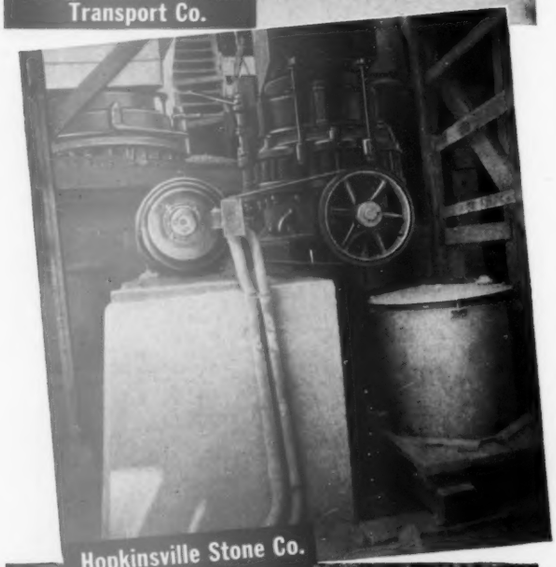
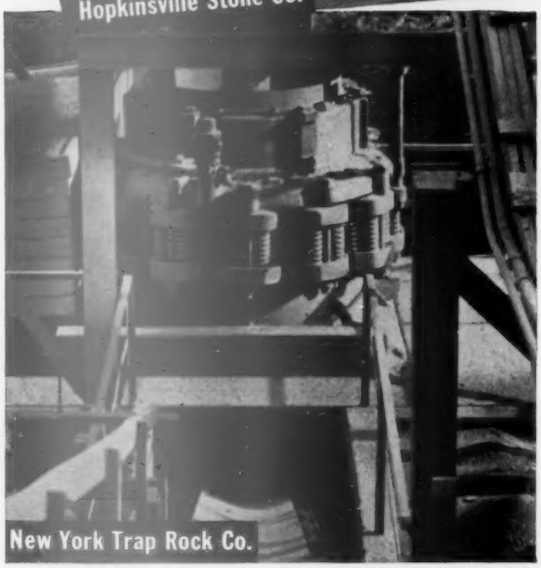
Kelley Island Lime and Transport Co.

Add a SHORT HEAD CONE for producing those minus ½ inch sizes



Hopkinsville Stone Co.



New York Trap Rock Co.

To meet the need for increased quantities of finely crushed materials, many producers of crushed stone, gravel and slag have added Symons Short Head Cones to supplement existing crushing equipment. A large number of these Short Heads follow Symons Standard Cones and make the extremely small sizes for which there is a constantly growing trend in practically all fields where crushed materials are required. With a Short Head, it is possible to make just the sizes for which there is an immediate demand. Unsalable sizes need not be produced in order to meet market requirements. Costly re-handling and stock piling are eliminated.

In addition to increasing capacity, Short Heads also lower the cost of making these finer crushed materials. If you have a demand for minus ½ inch sizes, you can make them in greater capacity and more profitably with a Symons Short Head Cone. That most of the larger producers use Cones for their fine crushing operations is proof of the superiority of this Crusher for this service.

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are you throwing away DOLLARS IN DUST?

FOUNDRY SHAKE-OUTS

Buell Collectors are widely used to collect dust in shake-out rooms, to prevent dust escaping from tumbling barrels, and to reclaim dust from the cleaning of molding sand.

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In machining operations such as grinding, buffing, milling, planing, etc., Buell Dust Collectors, applied to exhaust hood systems, have an outstanding record of high efficiency.

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Contamination of product in dryers utilizing dust laden waste heat gases is eliminated by the use of Buell cyclones, which have been found to have higher efficiency and lower power consumption than collectors which they replaced.

FOOD PROCESSING

Buell has developed collectors of special design and notable efficiency for many food products, such as powdered coffee, powdered milk, etc. Fabrication of stainless steel and hinged construction for easy cleaning meet all pure food law requirements.

CHEMICAL PRODUCTION

Buell Dust Collectors have proved highly efficient in removing contaminating flue dust from gases (such as sulphur dioxide in sulphuric acid manufacture), and in salvaging valuable dust (as in spray drying of magnesium hydrate) normally lost in exhaust.

THESE ARE JUST A FEW of the many applications in which Buell (van Tongeren) Dust Collectors are successfully serving such leaders of industry as Detroit Edison Co., Dow Chemical Co., Ford Motor Co., Lone Star Cement Corp., Nestle's Milk Products, Inc., and many others. The Buell Dust Technician in your territory will be glad to discuss the application of Buell (van Tongeren) Dust Collectors to your business.

Write for a copy of 24-page "Bulletin Q.11, Dust in Industry"

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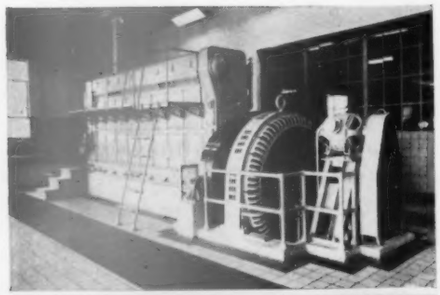
Superior DIESELS

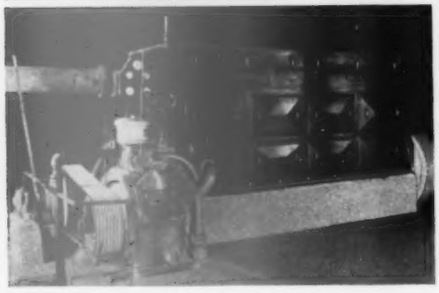
"Dependable Performance and Exceptional Economy". . . . .

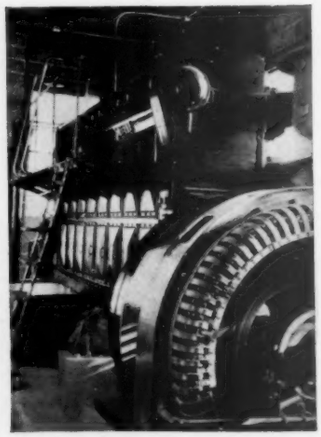
is the universal verdict on Superior Diesel installations in the rock products industry.

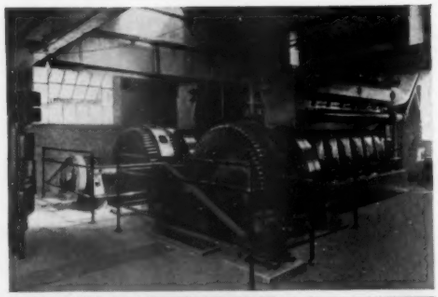
In every instance operators report fewer power interruptions, and vastly increased production, together with amazing savings in power costs.

May we name names and quote figures for YOU?









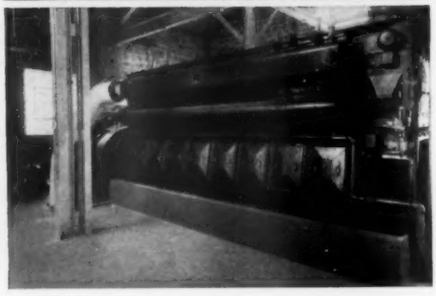


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FIGURE out what it costs you to make two passes through the material every time you fill the dipper.

Watch a Northwest in tough digging and you see at once why it's a *Real* Rock Shovel. With a Northwest, there is no *stuttering "second start" digging* to fill the dipper.

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—and when you have a Real Rock Shovel you won't have to worry about output in any digging!

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Built in a Range of 18 Sizes, 3/8 Cu. Yd. Capacity and Larger

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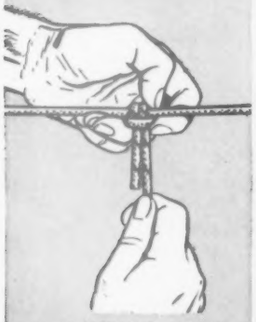

2. Half hitch branch to main line.

3. Connect main line lengths with *square* knot.

4. Fuse and cap on end of main line.

IMPORTANT

Branch lines should lead away from main lines at *right angles*. Avoid kinks and small loops.

Two holes (OR A THOUSAND) *that shoot as One!*

Use plain Primacord as the trunk line, unreeling it along the ground above the holes. Connect each branch line at right angles to this trunk, using a half hitch as shown. In this way you can connect two holes or a thousand or more and plan the larger blasts so that each row of holes is detonated in split-second rotation that allows relief of burden. It's all explained in the Primacord Book — free.

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Detonating Fuse

PB-30

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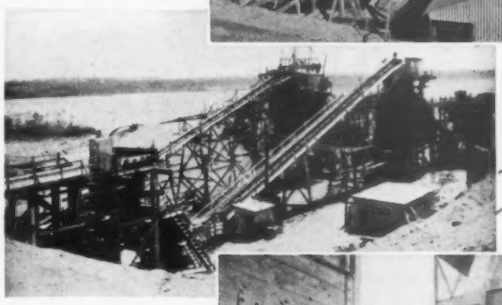
Dublin, Va.

Crystal Concrete
Products Co.
Braintree, Mass.

Like hundreds of Telsmith plants all over the world, these new rock crushing and gravel washing plants have operated smoothly, efficiently and profitably right from the start. Most of them are operating on defense work, where the production pressure is tremendous. A Telsmith plant means the latest in equipment—crushers to bin gates—Telsmith-designed-and-built for extra staying power, greater flexibility and capacity, lower operating and upkeep costs. And Telsmith *Balanced* Engineering Service and centralized responsibility fits that plant to your own particular needs. *Write for Bulletin EP-15.*



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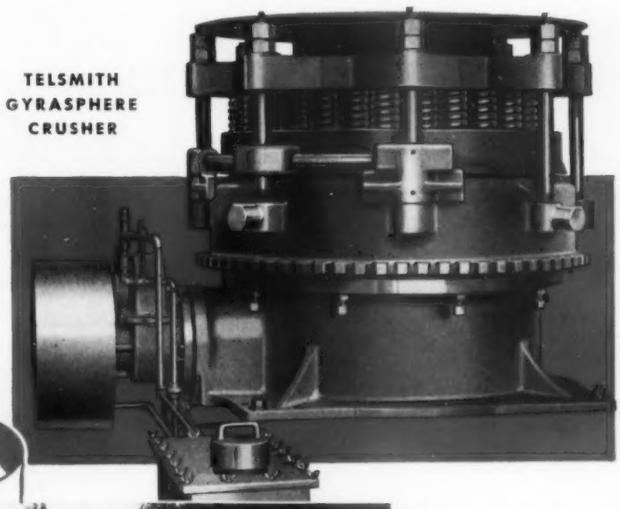
CRUSHER



Callan Construction Co.
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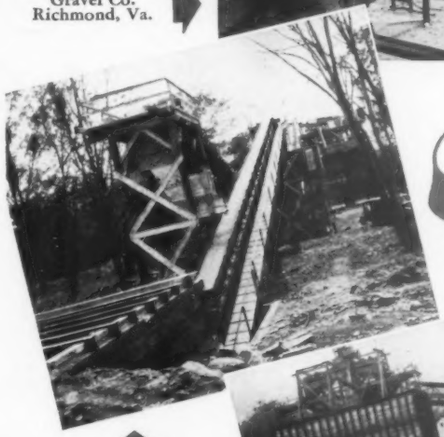
Richmond Sand &
Gravel Co.
Richmond, Va.



Arundel Corporation
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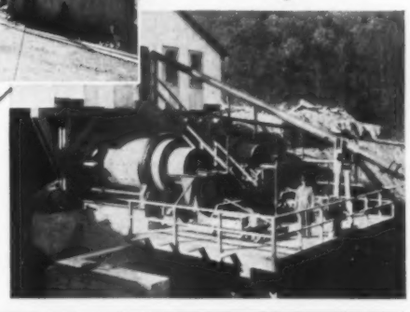
Baltimore, Md.

Rossoff Sand & Gravel Corp.
Kerhonkson, N. Y.



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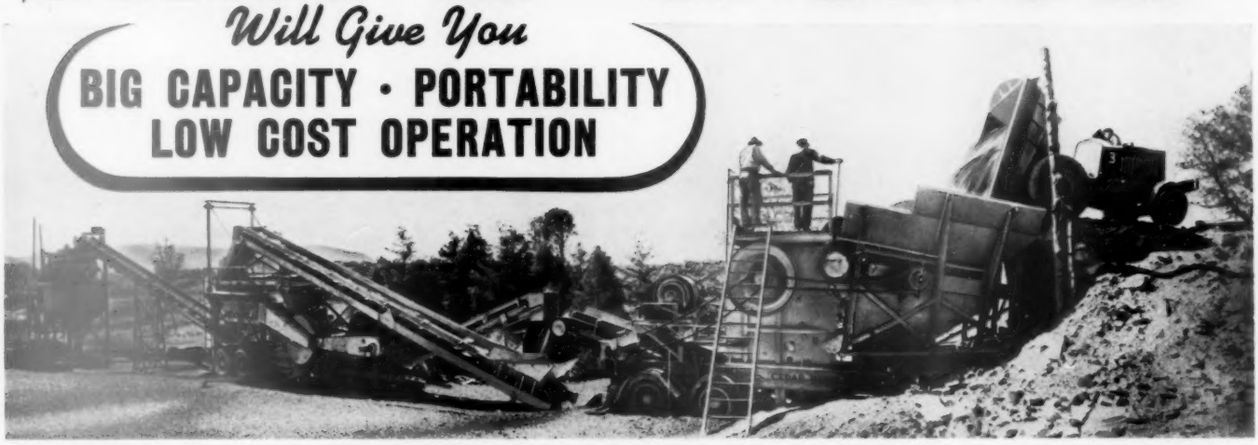
Will Give You

BIG CAPACITY · PORTABILITY
LOW COST OPERATION



THE CEDARAPIDS "MOROK" HANDLES MATERIAL IN A CONTINUOUS FLOW FROM QUARRIED ROCK TO DELIVERY TRUCKS IN ONE OPERATION

DO YOU WANT BIG CAPACITY?

Delivery of large quantities of aggregates, quickly, is a present day requirement. The "Morok" produces from 150 to 200 tons per hour.

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Quick moves, from one location to another, are essential, conserve time and money. The "Morok" is completely portable. Each operating unit is mounted on wheels. You can take it with you.

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The "Morok" may be entirely operated by electric motors or you may use individual diesel engines for the crushers and electric motors for screens and conveyors. V-belts and shafts with universal joints are used to simplify drives and decrease power consumption.

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IOWA MANUFACTURING COMPANY ▼ Cedar Rapids, Iowa, U.S.A.

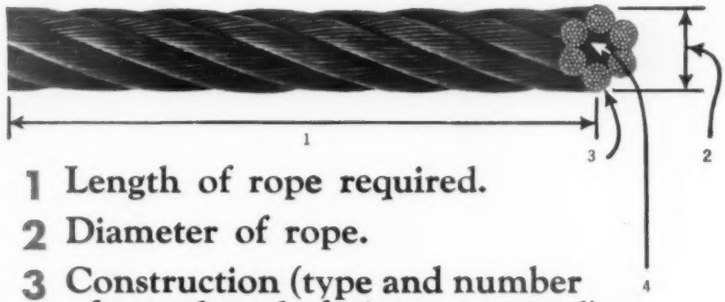
DEALERS IN ALL PRINCIPAL CITIES

DON'T BLAME the POOR WIRE ROPE

When and if a wire rope failure should occur, investigate the cause before deciding: "defective rope." In many instances, if the rope is not damaged in handling or by worn equipment, the trouble may lie in not having the proper type of wire rope for the job. "Don't blame the poor wire rope" for failure on a job it was not made to do.

Wire rope is a "specialty" and should not be vaguely ordered. There are over a dozen types of constructions under the general classifications of "6 x 19" and "6 x 37", etc. Only an expert wire rope man can know which particular type of rope to use.

Therefore, to get the proper rope, give the manufacturer *all* the available information, which should include the following:



1. Length of rope required.
2. Diameter of rope.
3. Construction (type and number of strands and of wires per strand).
4. Type of core (whether hemp or wire center).
5. Grade of steel.
6. Direction of lay (right lay, as shown, or left lay).
7. Regular lay, as shown, or lang lay.
8. "Union-Formed" or ordinary fabrication.

IT PAYS TO GET THE RIGHT ROPE FOR THE JOB— and this can be done only by giving the wire rope manufacturer full and complete information. If you cannot give data covering points of 3 to 8, then a full description of the equipment and operation will allow the wire rope engineer to decide the proper rope specifications.

UNION WIRE ROPE CORPORATION
GENERAL OFFICES AND FACTORY:
2100 Manchester Ave. Kansas City, Missouri
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WRITE FOR "ROPE DOPE"
. . . an educational bulletin, for additional information on the choice of wire ropes.

UNION Wire Ropes
The "ULTIMATE LOW COST WIRE ROPE"

The Year-Long Advertising Medium for Your Products—1942 Edition Closes Dec. 15

Pit and Quarry Handbook offers complete sales coverage for a full 12 months . . . in a year that promises, because of our National Defense Program, to be tops in demand for basic building materials. Catalog your products in this one and only Buyer's Manual of the industry—reach every prospect who authorizes or approves purchases in 6,000 producing plants. Ask about the new Quick Mail Inquiry System, included for the first time in the 1942 edition. Assures more traceable inquiries for your advertised products.

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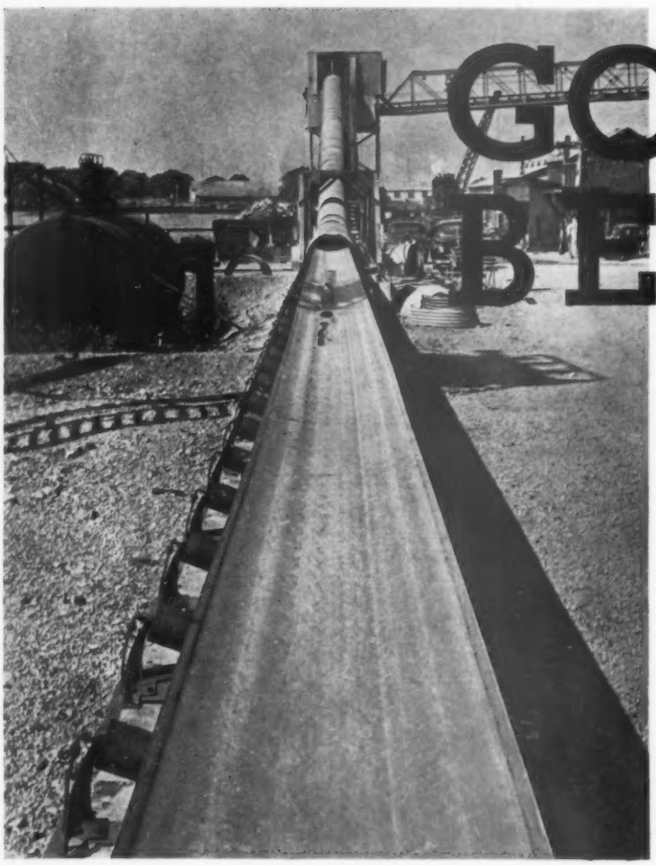

GOODALL BELTING

HELPS BUILD HUGE SHIPWAY-DRYDOCK for U. S. NAVY

At the Philadelphia Navy Yard, they're building a second big $10,000,000 Shipway-Drydock . . . and the long haul of sand and crushed stone from storage to mixer is **streamlined** by GOODALL'S

"TRIPLE-S" Bulk Conveyor Belting

There's 820 feet of this husky belting, 36″ wide . . . and it is lugging the load on a full speed-up schedule. Other specifications are: 6-ply, 32 oz. duck, with 3/16″ top cover and 1/16″ bottom cover; 2500 to 3000 lbs. tensile strength; 16 to 19 lbs. friction pull.

"Triple-S" is just right for long hauls and heavy loads like this. Its reputation for taking punishment, **longer,** has placed it in many other important installations, in constructions designed to meet the specific service conditions.

GOODALL builds belting for every purpose —conveyor, elevator, mucker, grader, transmission, etc. Each type is backed by the company's long experience in belting manufacture and the high standard of quality which it insures. **Let us quote on your next installation.**

★ ★ ★

Mail coupon for New Goodall Belting Catalog giving complete data on entire line.

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Please send copy of your New Belting Catalog.

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Company .....

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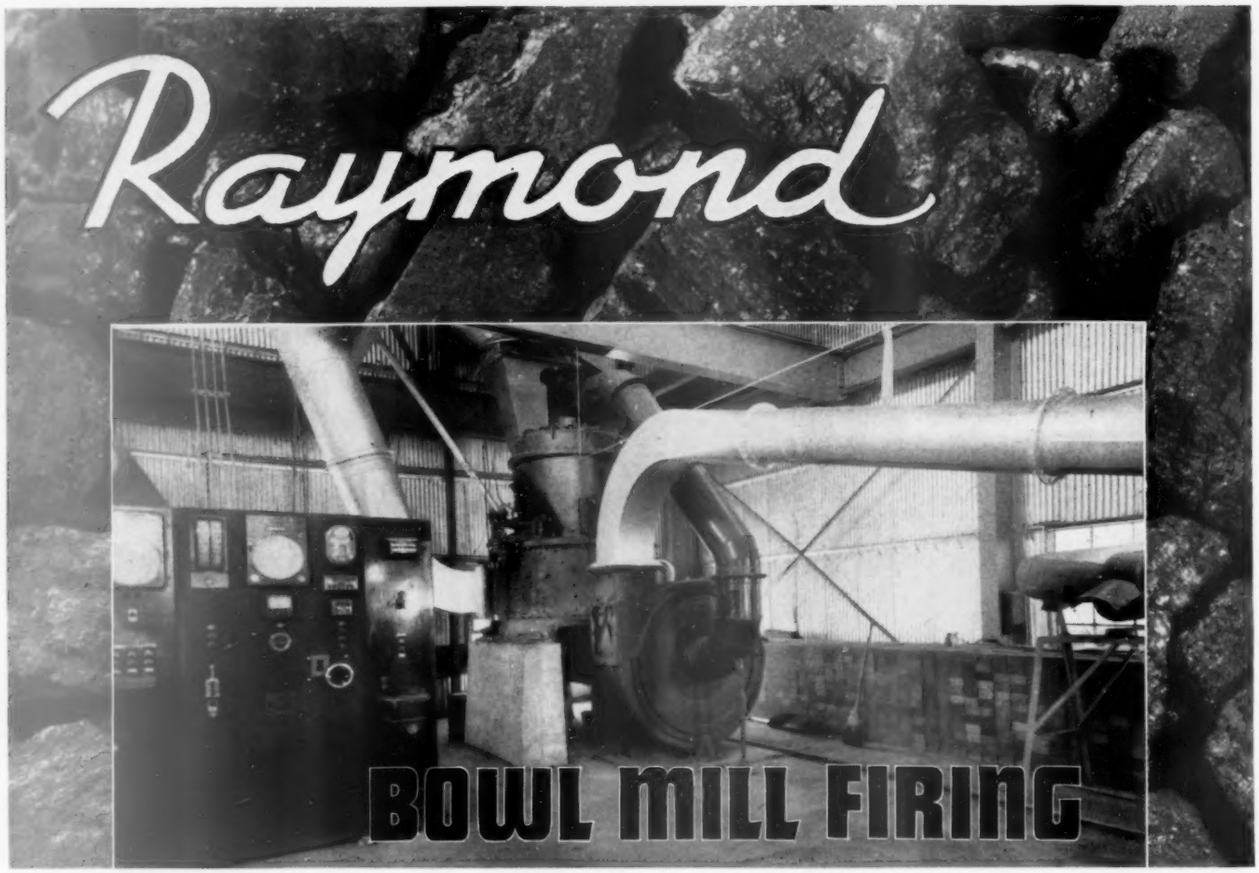
PHILADELPHIA • NEW YORK • BOSTON • PITTSBURGH • CHICAGO • MILLS: TRENTON, N. J., EST. 1873

GOODALL RUBBER CO. of CALIF.—SAN FRANCISCO • LOS ANGELES • SEATTLE • GOODALL RUBBER CO. of TEXAS—HOUSTON



Typical Bowl Mill installation with panel board. Over 700 units sold in past six years for direct firing boilers, cement and lime kilns and industrial furnaces, 30% on repeat orders.

The urgent need for "all-out" production makes it imperative for operators of cement, lime and similar plants to adopt this **dependable** method of direct firing rotary kilns.

The Bowl Mill is capable of continuous operation, month after month, 24 hours a day, without shutdowns . . . all adjustments being made while the machine is running.

Notice the panel board, shown above, which gives a constant operating picture of pressures throughout the system, the power required, rate of feed and temperature. The admission of hot air for drying is automatically controlled.

Handles any grade of coal . . . maintains a uniform grind . . . assures noiseless, vibrationless, dustless operation . . . sets an all-time low in total coal preparation costs . . . that's the Raymond Bowl Mill.

BOWL MILL
SINCE 1887

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DEC 19 1941

PIT AND QUARRY

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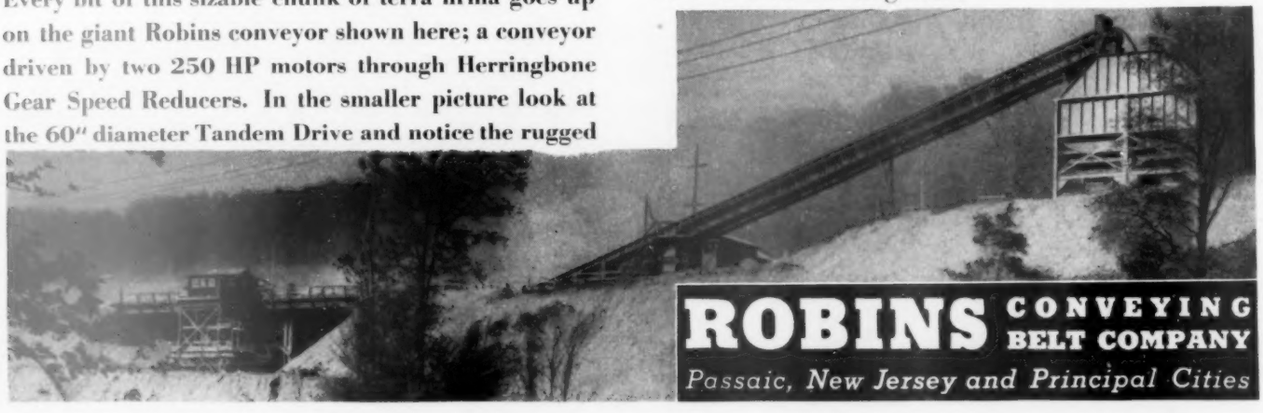
MEMBER AUDIT BUREAU OF CIRCULATIONS

60-inch Belt Conveyor, 325 feet long
Designed to carry 3500 T.P.H. up 105 feet

Building a dam to a time schedule demands equipment of the utmost reliability. That's why Geo. M. Brewster & Son, Inc., general contractors for Lackawack Dam (New York City Water Supply) chose equipment engineered and built by Robins for the task of moving 6,000,000 cubic yards of fill.

Every bit of this sizable chunk of terra firma goes up on the giant Robins conveyor shown here; a conveyor driven by two 250 HP motors through Herringbone Gear Speed Reducers. In the smaller picture look at the 60" diameter Tandem Drive and notice the rugged structure. The Heavy Duty Roller Bearing Idlers on this Conveyor have several special-to-Robins features, such as Triple Grease Seals and "One Shot" Lubrication.

Take a tip from this and many other large and small contracts engineered and equipped by Robins, and call for a Robins Engineer.



ROBINS CONVEYING BELT COMPANY

Passaic, New Jersey and Principal Cities

PIT AND QUARRY

CHICAGO NOVEMBER, 1941

West-Coast Group to Furnish Aggregates for New Canal Locks

The general purchasing officer of The Panama Canal, Washington, D. C., has awarded a $6,880,800 contract for furnishing 19,440,000 tons of aggregates for use in the concrete to be used in constructing the third set of locks at the canal to Nevada Constructors, Inc., of Las Vegas, Nevada.

The firm of Nevada Constructors, Inc., is made up of three separate Pacific Coast concerns: (1) J. C. Maguire & Company, (2) American Concrete & Steel Pipe Company, and (3) Griffin, Gunther, Shirley & Callahan.

The successful bidders are reported to have extensive deposits under option in the Canal Zone where the processing plant will be erected.

Permanente Prospectors Seek Dolomite Supply

A five-man crew of prospectors has been exploring an area in San Benito County, California, seeking dolomite for use in the Permanente Corporation's new magnesium plant, which adjoins the firm's cement plant at Los Altos.

If a sufficient supply is discovered, a roasting plant will be erected at the site to reduce the material to magnesium oxide.

New Firm Operating Kyanite Properties

Celo Mines, pioneer producer of kyanite from North Carolina schist which suspended operations early in 1941, has reopened its properties. The newly-formed company, known as Mas-Celo Mines, Inc., is affiliated with Munn & Steele, Newark, New Jersey, who have been active in the vermiculite business for several years. Vernon L. Mattson, who has been in charge of the Celo Mines development at Burnsville, North Carolina, will continue in a like capacity following the reorganization.

A specialty of the new concern, the Bureau of Mines reports, is a low-iron kyanite concentrate for glassmakers and for use in whiteware and special ceramic products. Refractory grades of kyanite also will be produced in varying standard grain sizes, analyzing 50 per cent. or better in alumina and less than ½ per cent. in iron. Mullite inverted from kyanite in rotary kilns is also available. Garnet, flake mica, and silica concentrates are joint products of the complicated milling process.

Submit Lowest Bids on Stone, Cold-Mix Topping

The Dolomite Products Company, Inc., was the low bidder with $12,320 on 16,000 tons of stone needed for use on the city's street-repair program at Rochester, New York. The Rochester Asphalt Material Company, Inc., was low on the 1,000 tons of cold mix for street topping with $5,430.

Coming Events

January 12-14, 1942—Buffalo. Annual convention, National Concrete Masonry Association, Hotel Buffalo.

January 28-30, 1942—Cincinnati. Annual conventions, National Sand & Gravel Association, and National Ready Mixed Concrete Association. Netherland Plaza Hotel.

February 2-5, 1942—Cincinnati. Annual convention, National Crushed Stone Association. Netherland Plaza Hotel.

Railroad Shipments to Increase Sharply in Fourth Quarter

A 26.9-per cent. increase in freight-car loadings of gravel, sand and stone in the fourth quarter of the current year over the corresponding period last year is forecast on the basis of estimates compiled by the 13 regional Shippers' Advisory Boards.

These estimates indicate that freight-car loadings of gravel, sand and stone will total 437,231 in the last quarter this year, compared with 344,500 last year.

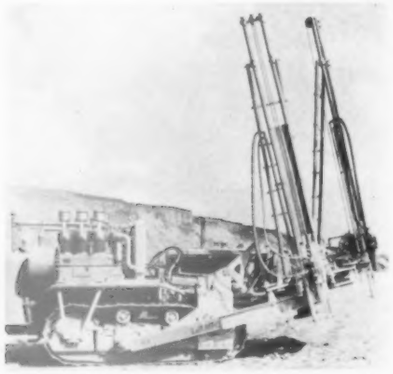
Loadings of cement are expected to increase 19.3 per cent., rising from 145,-544 cars in last year's fourth quarter to an estimated 173,689 this year. Car loadings of brick and clay products are expected to increase 20.9 per cent. from 63,651 last year to 76,956 this year, while a jump of 15 per cent. is forecast for car loadings of lime and plaster, rising from 40,344 last year to an anticipated total of 46,405 in this year's final quarter.

Urges Agstone Rejection Unless Finely Ground

County Agent R. T. Glassco at Janesville, Wisconsin, is backing a movement among farmers in that vicinity, urging that they refuse delivery on agricultural limestone unless it is ground finely enough to be of value as a soil builder. Too many quarry-plant operators are trying to sell a product that fails to meet Wisconsin College of Agriculture requirements that insist that at least 45 per cent. pass a 60-mesh screen.

"Some have argued that coarsely-ground limestone will last longer in the soil," Mr. Glassco said. "It certainly will! Some of that being offered in this county will last for 50 years before it becomes available for the purpose intended!"

New Equipment Goes in Service at Iowa Quarry of Marquette

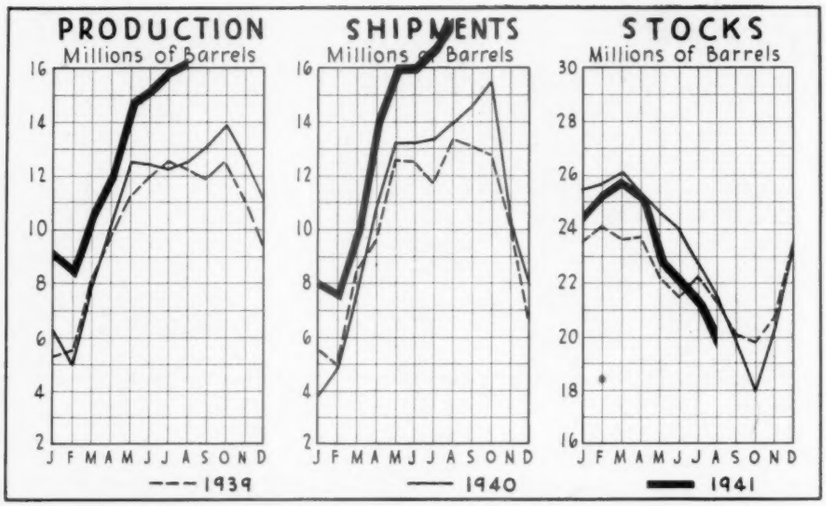


Mobile Caterpillar and LaPlant-Choate drill unit with Davey compressor and drills now being used in the Earlham quarry which supplies rock to the Marquette Cement Manufacturing Company's recently-acquired Hawkeye plant at Des Moines.

This General Electric Diesel-electric locomotive has the speed and power to deliver five loaded 50-ton cars to the railroad siding and return an equal number of empties every half hour.

A Hyster winch mounted on a Caterpillar tractor is placed opposite the Northwest shovel to spot cars in the quarry. Elevated platform enables operator to watch loading and move the car along a few feet at a time to load evenly and prevent overloading.

A plant for crushing and pulverizing limestone, built recently at Rice's Landing, Pennsylvania, by Fred Fox, has been acquired by the Peerless Lime Products Company of Pittsburgh.



The Portland-cement industry in August, 1941, produced 16,345,000 barrels, shipped 17,825,000 barrels from the mills, and had in stock at the end of the month 19,698,000 barrels of cement, according to the Bureau of Mines, U. S. Department of the Interior. Production and shipments in August, 1941, showed increases of 28.6 and 27.2 per cent., respectively, as compared with August, 1940. Stocks at the mills were 8.6 per cent. lower than a year ago, and were little more than 30 days' supply. The mills operated at 77 per cent. of capacity.

National Gypsum Reveals Sales, Advertising Plans

Plans for a long-term sales and advertising program designed to weather the current emergency and prepare for the business "scramble" which is expected to follow the "next great Armistice Day" were outlined by Robert E. Anderson, advertising and sales promotion manager of National Gypsum Company, in addressing the Sales Executives Club at a luncheon meeting at New York City on September 30.

Mr. Anderson said the program has as its keystone the bolstering of salesforce morale despite difficulties of present-day selling, a large-scale consumer advertising campaign and a trade-paper drive. In this way, he pointed out, the company will be prepared with a "hard-hitting" sales staff, loyal dealers and an informed public when the war ends and the rush for peace-time business begins.

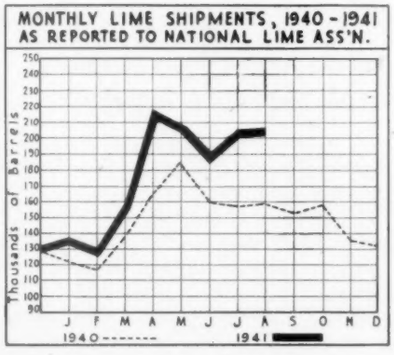
The sales force of the concern, which manufactures 157 wall and ceiling products, has grown from seven to 317 persons in its 15 years of existence, Mr. Anderson said. In order to protect this "investment in salesmen" during the present emergency, he added, company salesmen are being instructed to foster dealer acceptance of the concern's trade mark in lieu of individual products.

Declaring that many salesmen were becoming discouraged over present conditions, Mr. Anderson added: "With sales potentials cut and salesmen's income and expense accounts slashed, the far-sighted sales executive will realize that he must convince his sales organization that in this seller's market the salesman's services are not temporary."

EMPLOYMENT AND PAY-ROLLS

(Compiled for PIT AND QUARRY by Isador Lubin, Commissioner of Labor Statistics, U. S. Dept. of Labor.)

Industry	Establishments	Number of Employees	Pay Rolls (1 week)
Cement:			
June, 1941	130	22,328	$712,060
July, 1941	130	23,238	720,434
Percentage change		+4.1	+1.2
Quarrying and non-metallic mining:			
June, 1941	870	31,581	830,963
July, 1941	870	32,134	827,647
Percentage change		+1.8	—0.4



According to data collected by the National Lime Association, 71 companies in August, 1941, shipped 204,363 tons of lime (118,640 quicklime; 85,723 hydrate). Reporting companies represent 47.1 per cent. of the association's total capacity of record. Based on PIT AND QUARRY'S estimates for the remainder of the industry the total shipments for the month are estimated to have been approximately 430,000 tons. Shipments of lime by use and grade for August, 1941, were:

Use	Quicklime (tons)	Hydrate (tons)
Agricultural	2,067	10,342
Building	20,194	49,207
Chemical	96,379	26,174
Total	118,640	85,723

Recent Developments in Cement Industry of Latin America

Some time ago the Bureau of Mines published Information Circular 7102, *The Cement Industry of Latin America,* describing the cement plants of Mexico, Central America, South America, and the West Indies, and including a discussion of available raw materials, production, imports, and other data pertinent to the cement industry of that area. Because of present interest in the industrial activities of the South American republics the bureau has released a supplement to the report with the most recent available information, which follows:

Mexico.—The formation of a new cement company, Cementos Guadalajara, S.A., which is the first to be organized in Mexico for several years, was announced recently. Its plant is being constructed at Las Juntas, 5 miles from the city of Guadalajara, state of Jalisco, with a capital of 1,600,000 pesos supplied by a group of Mexico City banking interests headed by J. Lacaud y Cia. The two-kiln plant will produce special and masonry cements under the Blank process. A mortar product similar to the Plastocement produced in Puebla will be manufactured. It is expected that most of western Mexico will be supplied by this plant, which is scheduled to start production in a few months. It is reported that production will reach 600 barrels a day, with an annual capacity of 60,000 tons. Clay and other siliceous cement-making materials are to be found at the plant site. Limestone will be supplied by railway from the company's quarry 60 kilometers away.

Cementos Atoyac, S. A., Puebla, Mexico, recently acquired the property of Cementos Indio, S. A., a small one-kiln plant situated near the Atoyac plant. The Indio plant was built several years ago to produce cement by the wet-process method but ceased operations when the small marl deposit near was exhausted. This plant will be utilized in the production of Caloyac, the trade name for the Atoyac company's new masonry cement.

Cementos de Mixoac, S. A., has contracted with a United States firm for a new rotary kiln, which will substantially increase its production. The building-construction industry in Mexico has been hampered by a cement shortage. It is anticipated, however, that this situation will be remedied by stepping up production at the 8 plants functioning and the addition of the new plant mentioned above.

Brazil.—The S. A. Fabrica Votorantim of São Paulo has recently built a cement plant in Paulista, state of Pernambuco. Plans are being studied for construction of cement plants at Baía and Rio Grande do Sul.

Chile.—El Melon, the only cement factory in Chile, is unable to meet the current demand, which has been increased by an enlarged building program. The erection of a government-owned cement plant with an annual capacity of 150,000 metric tons has been proposed to the Chilean Congress. The Chilean Development Corporation recently announced plans to import 4,000 tons of cement from Argentina.

Colombia.—By the end of 1940 three new cement plants, Compañia de Cementos Argos and Marmoles Cementos del Nare, S. A., both at Medellin, and Cementos del Valle, S. A., Cali, were established. Plans are under way for the construction of two additional plants, one at Narino and the other at Santander.

Venezuela.—The new Venezuelan import tariff exempts imports of Portland cement from payment of duty, but imports are subject to prior permit from the Ministry of the Treasury.

Nicaragua.—According to a recent report the National Cement Production Company, Nicaragua, has ordered cement-plant machinery valued at $200,000. The new plant probably will have sufficient capacity to supply domestic requirements. At present all the cement consumed in Nicaragua is imported.

Puerto Rico.—The Puerto Rico Cement Corporation has completed installation of a second rotary kiln at its wet-process plant near San Juan. The new kiln increases the plant's existing annual capacity from 300,000 barrels to 500,000 barrels. The new unit began production in June 1941.

Cumberland Awards Contract for New Storage Facilities

The Rust Engineering Company, Birmingham, Alabama, has received a contract to design and build cement-storage facilities estimated to cost $50,000 for the Cumberland Portland Cement Company at Cowan, Tennessee.

The facilities will consist of four concrete silos approximately 30 feet in diameter and 70 feet high, and auxiliary structures. The silos will hold a total of 45,000 barrels of cement.

New Plant Processing Nova Scotia Barite

In October, 1940 a deposit of high-grade barite of considerable size was discovered near Walton, Nova Scotia. The Bureau of Mines reported that diamond-drill operations up to that time had revealed that somewhat more than 200,000 short tons was available. According to information just received by the bureau, continued drilling has shown that there is about 1,500,000 tons at least.

A grinding plant at the property, reported to have a capacity of 100 tons daily, was completed in June, 1941, at a cost of $65,000. To date 2,500 short tons has been shipped to Trinidad. It is stated that another shipment of 1,000 tons is ready to go forward, and it is estimated that, by the end of 1941, 15,000 short tons will be ready for sale. Previously the product was ground to suit the requirements of the Trinidad purchaser, which are said to include a specification of 98 per cent. through 325-mesh and a specific gravity of 4.3 to 4.4. Although the product is discolored, it will be bleached, it is reported, for use in the manufacture of lithopone.

This Allis-Chalmers HD-14 tractor and Continental 10-cubic yard scraper are stripping overburden for a gravel pit near Granger, Ohio. The outfit moves from 500 to 600 cubic yards per 8-hour day and is owned by the Allied Supply Company of Medina.

Construction Awards in First 9 Months Soar to New "High"

Construction contracts awarded in 37 eastern states during the first nine months of 1941 amounted to $4,510,879,000 according to F. W. Dodge Corporation, while in the comparable period of 1940 the award volume was $2,784,352,000. Not since 1929 has the construction volume exceeded $4,500,000,000 during the first nine months of the year.

In the first three quarters of 1941, non-residential building expanded to $1,682,166,000—more than double the volume in the corresponding period of 1940. Residential-building contracts awarded amounted to $1,561,285,000, an increase of 38 per cent. over the 1940 nine-month volume of $1,136,362,000.

Building and engineering contract awards during September, 1941 totaled $623,292,000, somewhat reduced from the record level of August 1941, but 79 per cent. larger than September, 1940. It was also the largest volume for any September recorded in the F. W. Dodge Corporation record of construction in 37 eastern states.

Commenting on the September contract record, Thomas S. Holden, president of F. W. Dodge Corporation said: "Recent trends toward peak construction activity are obviously dampened considerably by the S.P.A.B. order of October 9 restricting non-defense construction. Nevertheless, the defense-construction and defense-housing needs of the coming year will require a very large construction volume, probably more than in any post-depression year except 1940 and 1941. The defense program requires a continuing record volume of defense-plant construction, warehouse facilities of many kinds for handling defense materials, defense housing at the rate of 50,000 family units a month, defense highways, community facilities (including necessary commercial buildings) to serve defense areas, and necessary modernization, rehabilitation and repairs of existing buildings."

Air Hygiene Foundation Assumes New Name

The Air Hygiene Foundation of America has announced a change of the organization's name to Industrial Hygiene Foundation of America, Inc.

When the Foundation was organized emphasis was placed on silicosis. With the rapid advances of industrial hygiene and the multiplication of new occupational-health problems, the Foundation's work has steadily broadened. A study is now under way, with the collaboration of the U. S. Public Health Service, to help reduce sick absenteeism which is costing the heavy industries alone about 1,000,000,000 man-hours yearly. Other accomplishments include continuing studies of X-ray technique for large-scale physical examinations in industry; studies of the control of toxic fumes and gases, including proper precautions in welding; a research, now in progress, to develop further practical data on exhaust ventilation; investigations in "protector" dusts, including aluminum, to combat dust diseases.

The Foundation's sixth annual meeting will be held at Mellon Institute, Pittsburgh, November 12 and 13. The theme of the program will be "Defend the Defense Worker."

W. M. Powell of Medusa Heads Safety Groups

The National Safety Congress was held as scheduled at the Stevens Hotel. Chicago, October 6 to 10. Among the section meetings was the gathering of the Cement and Quarry Section which held sessions on two days. Officers for the 1941-1942 year for the section were chosen as follows:

General Chairman—W. M. Powell, Medusa Portland Cement Company;

Vice Chairman—H. F. Yotter, General Crushed Stone Company; David Adams, Lawrence Portland Cement Company.

Secretary—A. J. R. Curtis, Portland Cement Association.

News Letter Editor—Jack Dempster, Canada Cement Company.

Highway Research Board to Meet in Baltimore

Changing a custom of 20 years' standing on account of the need for conserving Washington facilities for urgent defense needs, the Highway Research Board announces that its annual meeting will be held at Johns Hopkins University, Baltimore, Maryland, the first week of December, 1941.

Lime Association to Convene May 26-28

The board of directors of the National Lime Association, at a recent meeting at New York, selected the Homestead Hotel, Hot Springs, Virginia, as the place of the 1942 annual convention.

The dates are May 26, 27, and 28.

Fire caused $6,000 damage in September to the plant of the Lansing Sand & Gravel Company.

WPA Administrator to Head Charleston Gravel, Brick Firms

E. C. Smith, Jr., has been named president and general manager of the Standard Brick & Supply Company and the West Virginia Sand & Gravel Company, affiliated organizations with headquarters at Charleston, West Virginia, according to an announcement by DeWitt Gallaher, vice-president. He succeeds the late Burr H. Simpson.

Prior to assuming his new duties, Mr. Smith resigned his position in Washington as national director of the Public Work Reserve. He went into the federal government's service six years ago after 30 years of experience in engineering and construction. A resident of Charleston, he is a civil-engineering graduate of West Virginia University.

After serving as Deputy WPA Administrator in West Virginia, Mr. Smith was advanced to chief regional engineer with headquarters in Philadelphia. For a short time he served as Acting State WPA Administrator in Pennsylvania and then was transferred to Baltimore as chief engineer of Region 3. Later, he was transferred to Washington as chief coördinator of national defense projects in the WPA, and then was made director of the project-control division.

When Public Work Reserve was created by the Congress for the purpose of developing projects to lessen unemployment in the post-defense period, Mr. Smith was named national director.

Storekeeper Injured; Spoils Perfect Record

Chances for a perfect safety record for 1941 went glimmering in September at the Bonner Springs, Kansas, plant of the Lone Star Cement Corporation when Arthur Curtis, storekeeper, dropped a heavy drive-shaft on his foot.

He spent several days in a hospital under the care of the company physician before he was able to return to his duties.

Industrial Health Parley in Chicago

Under the auspices of the American Association of Industrial Physicians and Surgeons the American Conference on Industrial Health will hold its second annual meeting on November 5 and 6, at Chicago Towers, in Chicago.

This organization maintains a public forum for all who are interested in the prevention of disease, injury and disability in industry, and the active supervision and promotion of health in industrial groups.

Industrial Sand Men Discuss Problems Facing Industry

The board of directors of the National Industrial Sand Association held its semi-annual meeting in the Palmer House, Chicago, October 15. They decided on the Homestead, Hot Springs, Virginia, as the place and June 5 and 6, 1942, as the time of the next annual convention.

Hamilton Allport, chairman of the Research Committee, reported on the advisability of the association's conducting research in behalf of the industry. The committee had been instructed to examine the question whether the association should undertake a research program the scope of which should not include product research, such as the development of new products, new uses for existing products, improvement in the use of old product, nor general "trouble shooting" for member companies.

The committee outlined by a chart three possible major research activities: (1) Product research, (2) sales research, and (3) production research. His report brought out the facts that there is a limited likelihood of developing new uses for sand because the industry is an old one most of whose possibilities have already been developed, it is ancillary to the industries it serves, and it is a simple industry; that research is expensive and little money is available for it; that definitive findings would result in conflicts of interest; that although the industry's members make many different products not all members are interested in them all; that purchasers of the industry's products have their own findings and beliefs; and that the association is not set up for research work.

The committee reported that research might study the decline in the uses of industrial sand brought about by the decline in the foundry industry (supersession of castings by stampings, structural construction, plastics, steel castings, etc.); by the decreased use of sand by foundries due to improved practices, reclamation, etc.; by the substitution of plastics and cardboard for some glass containers.

Increased use may be found in new uses for glass (fiber glass, insulating materials, etc.), in construction (more and larger windows), and in the development of glass bricks and blocks and other building materials.

The committee thought that some research might be done in connection with other trade associations.

No new reports of car shortages have been received by the association, but the number of bad-order cars is excessive and box-cars are being substituted for open-top cars. The production capacity of the industry was estimated at 2½ times the 1940 output.

Some interesting reports on labor conditions were presented. One producer told of a more than 50 per cent. increase in the output per man-hour in the last three years (from ¾ ton to 1¼ tons), while wages had risen 37 per cent. His company's labor contract has been extended to January 1, 1943 and involves an increase of 5 cents an hour. The minimum rate is 60 cents, shovel men receiving 85 cents. There is no overtime except on Sundays. The check-off system is in operation.

Another producer, operating a plant that is not unionized, granted a 5-cent per hour increase in March. In another of his plants a similar increase was made immediately effective, and another 5-cent jump October 1. In another plant a demand for 10 cents was quieted with 5 cents.

In the plant of another producer the minimum wage is 67½ cents an hour, the highest $1.10, the average 75 cents. The present contract expires in December.

In one A. F. L. plant the minimum is 58 cents an hour based on an 8-hour day and 40-hour week. The plant works two 8-hour shifts. The contract expires October 1, 1942, and involves a 5-cent increase granted last June.

In one C. I. O. plant the minimum is 60 cents, the average 70, mechanics receiving over $1. Overtime is paid after 8 hours.

In another unorganized plant the minimum is 60 cents; cranemen receive $1.

One producer under contract with the A. F. L. pays from 67 cents to $1.00 an hour, overtime after 8 hours. There was a 5-cent increase in January and one of 2½ cents in May. There has been a 55-per cent. increase in wages in 5 years.

In another unorganized plant there was a 10-per cent. increase April 1, and a 3-cents an hour rise in two plants in the last two months.

Executive Secretary Ahearn explained that four labor unions are operating in the industrial-sand industry:

(1) The Teamsters' Union—an A. F. L. organization operating in two plants in New Jersey.

(2) The United Stone & Allied Workers—a C. I. O. organization developed from the former International Quarrymen's Union (A. F. L.).

(3) The Glass Bottle Blowers' Union (A. F. L.), which has organized two plants.

(4) The Glass, Ceramics and Silica Sand Workers (C. I. O.), which has organized plants in the Ottawa, Illinois district.

A discussion of the priority situation brought out the development that has taken place in the method of obtaining repair parts. Preference Rating Order P-56, under which the industry will operate as soon as the OPM issues serial numbers to the plants entitled to them, applies to supplies and emergency inventory in addition to repairs covered by the earlier P-22 order. The industry's priority position is thus raised from A-10 to A-8. Some of these serial numbers have already been assigned and producers notified.

The following members and guests were in attendance:

V. P. Ahearn, *executive secretary* (National Industrial Sand Assn., Washington, D.C.)

Hamilton Allport (Standard Silica Co., Chicago, Ill.)

E. M. Ayers (Ayers Mineral Co., Zanesville, O.)

W. H. Baker (Baker Sand Co., Benton Harbor, Mich.)

E. J. Beyer (Michigan Silica Co., Rockwood, Mich.)

John N. Bos (John F. Bos Sand Co., Chicago, Ill.)

J. T. Cable (Minnesota Mining & Manufacturing Co., Akron, O.)

J. J. Cleary (Oneida Lake Sand Mines, Cleveland, N. Y.)

John D. Cronenweth (Great Lakes Foundry Sand Co., Detroit, Mich.)

A. F. Farmer (Sand Products Co., Cleveland, O.)

Sterling Farmer (Sand Products Co., Cleveland, O.)

L. M. Hansen, *president* (Industrial Silica Co., Youngstown, O.)

C. M. Hardy (Hardy Sand Co., Evansville, Ind.)

Harry Hardy (Hardy Sand Co., Evansville, Ind.)

Tom H. Hardy (Hardy Sand Co., Evansville, Ind.)

Russel G. Hay (Ayers Mineral Co., Zanesville, O.)

William B. Hughes (John N. Bos Sand Co., Chicago, Ill.)

B. Lorentzen (Minnesota Mining & Manufacturing Co., St. Paul, Minn.)

D. R. Martin (Standard Silica Co., Ottawa, Ill.)

D. S. McDougal (Ottawa Silica Co., Ottawa, Ill.)

William J. Muhlitner (Great Lakes Foundry Sand Co., Detroit, Mich.)

P. W. Palmer (Brownstown Silica Co., Brownstown, Wis.)

Stanley A. Phillips (PIT AND QUARRY, Chicago, Ill.)

John Putnam (National Silica Co., Oregon, Ill.)

Nathan C. Rockwood (*Rock Products*, Chicago, Ill.)

E. O. Schneider (Ottawa Silica Co., Ottawa, Ill.)

Ralph S. Stevens, *treasurer* (Cape May Sand Co., Cape May, N. J.)

Junius M. Strouss, *vice-president* (Decker's Creek Sand Co., Morgantown, W. Va.)

George A. Thornton (Ottawa Silica Co., Ottawa, Ill.)

Stanton Walker, *consulting engineer* (National Industrial Sand Assn., Washington, D. C.)

A. Warsaw (Wedron Silica Co., Chicago, Ill.)

William J. Woods (Pennsylvania Glass Sand Co., Lewistown, Pa.)

CURRENT BUSINESS INDICATORS

In what is easily the most drastic action that has yet been taken in the present emergency, the Supply Priorities and Allocations Board on October 9 issued an order prohibiting non-defense construction for the duration of the defense effort. The explanation for this sweeping decision is the shortage of such raw materials as steel, copper, brass, bronze, and aluminum that are required for direct military purposes.

The order applies to public projects such as the building of post-offices, schools, and similar structures; to the construction of roads and highways; to river and harbor improvement; and to flood-control and power projects. It applies to the construction of factories, warehouses, office buildings, and all other commercial construction. Finally, unless the health and safety of the public is involved directly, it applies to all residential building.

As a result of the order, all building projects in the future will be subjected to the following tests:

(1) Does the project involve the use of appreciable quantities of critical materials?

(2) Is the project directly necessary for national defense, or clearly essential for the health and safety of the civilian population?

The net effect of SPAB's order is expected to reduce the dollar value of construction in 1942 by about one-fourth below the level that has prevailed during the current year. In brief, the value of new construction is expected to decline from an estimated total of $11,200,000,000 in 1941 to approximately $8,500,000,000 next year. That the reduction will not be more severe is explained by the fact that there remains a backlog of $6,250,000,000 of defense construction still to be completed. In addition to this item, a certain amount of non-defense building will probably be permitted under the SPAB program.

Although the ban on non-defense building has been by far the most significant development of recent weeks, the course of business has been influenced profoundly by a number of other factors. First, disbursements for defense purposes rose to approximately $1,347,000,000 in September, an increase of 18 per cent. over the month preceding. At the same time appreciable increases were registered in the physical production of war material. Military aircraft production advanced to 1,914 during the month, an increase of 60 over August. Similar increases are indicated in the September output of airplane engines, tanks, and combat ships. Still another important development was SPAB's approval of the plan for increasing the capacity of the steel industry by 10,000,000 tons.

Despite the heavier military output during the month, industrial production showed little improvement over the level reached in August. This is largely a reflection of the widespread shortages of many of the basic raw materials. Due to lack of materials many plants have been forced to close in recent weeks, and at many others operations have been drastically reduced. Closings and curtailment of operations due to material shortages are certain to become progressively more prevalent during the remainder of the year.

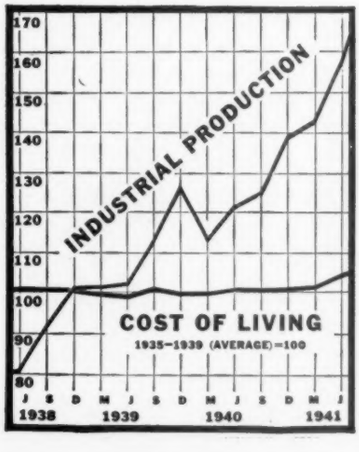
The over-all business record of the past month, however, is one of continued progress. Activity in the iron-and-steel industry improved moderately, with the rate of operation being maintained at slightly better than 96 per cent. of capacity. Some improvement was also reported in the textile industries, while crude-petroleum production has advanced to record-breaking levels. Cement shipments likewise rose to an all-time high, advancing from 17,825,000 barrels in August to 18,284,000 barrels in September.

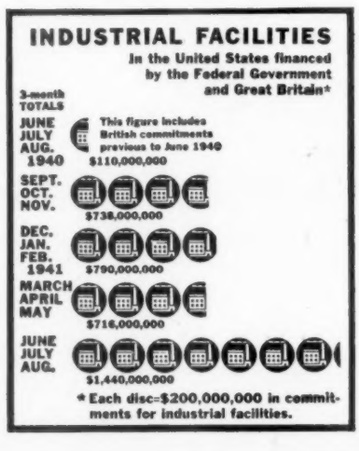
Freight-car loadings, on the other hand, advanced somewhat less than seasonally. Loadings for the past several weeks, however, have been considerably in excess of 900,000 cars a week, which is the highest level that has been reached for more than a decade. Consequently, the less-than-seasonal advance is accounted for largely by the unusually high volume of loadings maintained throughout the summer.

A particularly noteworthy increase was reported in construction activity during the month. On a seasonally-adjusted basis the index of construction contracts rose from 152 in August to 159 in September. In comparison with a year ago the September rate of construction activity shows an increase of almost three-fourths.

Wholesale prices continued to move upward during September, but at a somewhat slower pace than in other recent months. The Bureau of Labor Statistics index for the month stood at 91.8 (1926=100) compared with 90.3 in August. A leveling off of farm products and foods was largely responsible for the more moderate rise in the composite index. Prices of other products, notably building materials, textiles, and chemicals, continued to advance vigorously during the month.

Most observers now believe that the index will reach 100 by the end of the year and sometime in 1942 will reach 120. Corresponding increases are expected in living costs.





Contract - Distribution Offices. — Forty-four contract-distribution offices are now organized and operating. Each state will have at least one office and some states several others reporting to the main state office. In all cases the location and number of offices will be related to the amount of industrial facilities existing in the area, according to the new Contract Distribution Division of the OPM. Offices will soon be opened in a number of other cities including Albany, New York; Portland, Maine; Rochester, New York; Spokane, Washington; Springfield, Illinois; Springfield, Massachusetts; Trenton, New Jersey; Wichita, Kansas; and Youngstown, Ohio.

The following offices are now in operation. The address in each case is care of the Federal Reserve Bank or Branch Bank in each of the cities named, unless some other address is given:

Alabama—Birmingham.
Arkansas—Little Rock.
California—Los Angeles and San Francisco.
Colorado—Denver.
Connecticut—Hartford, Bank Bldg., 805 Main St.
Florida—Jacksonville, 504 Hildebrandt Bldg.
Georgia—Atlanta.
Illinois—Chicago; Springfield, 307 First National Bank Bldg.
Indiana—Indianapolis, Circle Tower Bldg.
Iowa—Des Moines, 505 Crocker Bldg.
Kentucky—Louisville.
Louisiana—New Orleans.
Maryland—Baltimore.
Massachusetts—Boston; Worcester, State Mutual Bldg., 340 Main St.
Michigan—Detroit.
Minnesota—Minneapolis, 240 Rand Tower Bldg.
Missouri—Kansas City and St. Louis.
Montana—Helena.
Nebraska—Omaha.
New Jersey—Newark, 176 Sussex Ave.
New York—Buffalo, Trader's Bank Bldg., Main and Swan Sts.; New York City; Syracuse, Chamber of Commerce Bldg., 341 Warren St.
North Carolina—Charlotte, New Liberty Life Bldg.
Ohio—Cincinnati, 804 Union Trust Bldg.; Cleveland; Columbus, 305 Spahr Building, 50 E. Broad St.; Dayton, 1021 Third National Bank Bldg., 32 N. Main St.
Oklahoma—Oklahoma City.
Oregon—Portland.
Pennsylvania—Philadelphia and Pittsburgh.
Rhode Island—Providence, Industrial Trust Bldg., Westminster St.
Tennessee—Memphis and Nashville.
Texas—Dallas; El Paso; Houston; San Antonio.
Utah—Salt Lake City.
Virginia—Richmond.
Washington—Seattle, National Bank of Commerce Bldg.
West Virginia—Wheeling, Hawley Bldg., 1025 Main St.
Wisconsin—Milwaukee, 1124 First Wisconsin National Bank Bldg.

Maintenance and Repairs. — A maintenance, repair and supplies plan which will help approximately 15,000 mines to boost their production for defense was announced September 18 by Donald M. Nelson, Director of Priorities, OPM.

The order permits mining companies to use a rating of A-1-a—the highest defense rating—to expedite deliveries of materials needed for emergency repairs.

A rating of A-8 may be used by mine operators and their suppliers to obtain material required for emergency inventory purposes or for operating supplies or for ordinary maintenance work.

A special plan has been developed to administer and operate the order. The governor of each state has been asked to designate a state official, preferably an official dealing with mining operations, to help administer the order in his state.

It is expected that the state official in each case will be known as the Emergency Coördinator of Mines. This official will submit to the OPM a list of the active mines in the state. He will also receive in his office each month a list of all purchases made under the terms of the order by the mines, and he will report any excessive purchases or irregularities to the OPM for investigation.

After consideration of the lists submitted by the emergency coördinator in each state, the Priorities Coördinator for Mines will assign serial numbers to all mines approved. Dr. Wilbur A. Nelson, Priorities Coördinator for Mines in the Office of Production Management, will administer the order.

Purchases made by mines for repair parts, maintenance items and operation supplies will carry an endorsement on the purchase order certifying that the purchases are made under the terms of the new order, P-56. No special forms are required in connection with the application of the rating to deliveries.

Suppliers of mining operators can extend the rating by a simple endorsement and a reëxtension can be made to other suppliers in the same manner.

A mine operator or a supplier, in order to apply the A-8 rating, must endorse a statement on the original and all copies of each purchase order for material to be used for the purposes specified, certifying that the order is placed in accordance with the terms of the new plan.

A mine operator before he can apply the A-1-a preference rating for emergency repairs must first ask permission by telephone, telegram, or letter from the Priorities Coördinator for Mines. Telegram authorization by the coördinator will be sufficient to permit the purchase of the necessary materials under the emergency A-1-a rating.

Around 15,000 mines of all kinds will be eligible for inclusion. Gold placer mines are excluded, but other placer, dredge or hydraulic mines producing products other than gold are included. Open-pits and strip mines are included, and this will include producers of many building materials.

The order includes provisions to restrict inventories to proper levels.

It also includes a provision saying that every person affected by the order shall make every effort to conserve critical materials by conservation, simplification, standardization or any other program developed by the Office of Production Management. The Director of Priorities may from time to time issue specific directions as to conservation and standardization practices. The provisions of Preference Rating Order P-22 (the general repairs order for essential industries) are revoked in so far as they relate to mines.

The P-56 order of September 17 and the amendment of it, dated September 22, have been combined in the following composite text:

TITLE 32—NATIONAL DEFENSE
CHAPTER IX—OFFICE OF PRODUCTION MANAGEMENT
SUBCHAPTER B—PRIORITIES DIVISION
PART 982—MINES
*Maintenance, Repair, and Supplies Preference Rating Order No. P-56**

982.1 Preference Rating Order.

For the purpose of facilitating the acquisition of material for the maintenance and repair of the property and equipment of, and for supplies for mines, preference ratings are hereby assigned to deliveries of such material upon the terms hereinafter set forth, until such time as the Office of Production Management certifies specific quantities of such material to

[* As amended September 22, 1941.—Ed.]

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DEFENSE PROGRESS

United States Army Oct. 9	1,588,500
Navy and Marine Corps, Oct. 1	366,629
Nonagricultural workers, Aug.	*39,542,000
Per cent. increase since June, 1940	11.6
18 defense industries, Aug.	2,589,200
Per cent. increase since June, 1940	60.3

FINANCE
June 1940—September 30, 1941

Authorized program	*$56,792,000,000
Contract awards	*37,554,000,000
Total disbursements	*10,650,000,000

PRODUCTION

Paid on contracts, June 1940—Sept. 30, 1941	*$8,330,000,000
Military aircraft, September	1,914
Combat vessels, September	*6
Merchant ships, September	*9

Week Ended October 11

	Strikes	Workers
Significant defense strikes in progress during week	7	12,100
Number settled	2	6,000

* Preliminary

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which the preference ratings herein assigned may be applied

(a) *Definitions*

(1) "Person" means any individual, partnership, association, corporation, or other form of enterprise.

(2) "Mine" means any plant physically situated within the limits of the United States, its territories and possessions, and actually engaged in the extraction by surface, open-p.t or underground methods, or in the beneficiation, concentration, or preparation for shipment of the products of mining activity.

(3) "Mine operator" means any person operating a mine to whom a mine serial number has been issued in accordance with the provisions of paragraph (b).

(4) "Supplier" means any person with whom a purchase order or contract has been placed by a mine operator or another supplier for material—

(i) required by a mine operator for maintenance, emergency repair, emergency inventory, or operating supplies of a mine, or

(ii) to be physically incorporated in other material so required by a mine operator.

(5) "Material" means any commodity, equipment, accessories, parts, assemblies, or products of any kind.

(6) "Maintenance" means minimum upkeep necessary to continue the working condition of the essential operating equipment of a mine at its then current rate of production.

(7) "Emergency repair" means a restoration of mine property which is necessary to re-establish mine operation after a breakdown or suspension of operations because of damage, wear and tear, destruction of parts, or the like.

(8) "Emergency inventory" means minimum inventory of material required to make reasonable advance provision for emergency repair of a mine.

(9) "Operating supplies" means material which is essential to and consumed in the operation of a mine and which is generally classified as "mine supplies" or "mine stores."

(b) *Certification of Mines*

(1) *Domestic Mines.*—The agency designated by the governor or other chief executive officer of each state, territory or possession of the United States shall furnish in duplicate to the Office of Production Management a certificate setting forth the name of the persons operating mines within such state, territory or possession. The Office of Production Management will thereupon issue a mine serial number, through such state agency, to each such person who may be approved by the Director of Priorities. Any person aggrieved by failure or refusal of a state agency to certify him as a mine operator may apply in writing to the Director of Priorities for issuance of a mine serial number. The Director of Priorities may thereupon take such action as he deems appropriate.

(2) *Foreign Mines.*—The Director of Priorities may, in his discretion, issue a mine serial number to a person operating a mine outside the limits of the United States, its territories and possessions.

(c) *Assignment of Preference Ratings*

Subject to the terms of this order, the following preference ratings are hereby assigned, but nothing herein contained shall prevent the use of any other or higher rating to which any person may be entitled by reason of any other Preference Rating Certificate or Order.

(1) A-1-a to deliveries to a mine operator of material essential for emergency repair of a mine, as approved by the Office of Production Management pursuant to paragraph (e) (1).

(2) A-8 to deliveries to a mine operator of material required for emergency inventory or for operating supplies or for maintenance of a mine.

(3) A-8 to deliveries to a supplier

(a) of material required by a mine operator for maintenance, emergency repair, emergency inventory or operating supplies of a mine, and

(b) of material to be physically incorporated in other material so required by a mine operator.

(d) *Persons Entitled to Apply Preference Ratings*

The preference ratings hereby assigned may be applied by a mine operator or by any supplier making to a mine operator or another supplier deliveries of the kinds specified in paragraph (c) which have been rated pursuant to this order.

(e) *Application of Preference Ratings*

(1) A mine operator, in order to apply the A-1-a preference rating assigned by paragraph (c) (1), must communicate with the Office of Production Management, describing the material essential for emergency repair and the nature of the emergency necessitating such repair. The Office of Production Management will notify such mine operator whether, and to what extent, his application is approved, and a copy of such notification shall be furnished by the mine operator to his supplier to evidence the A-1-a rating.

(2) A mine operator or a supplier, in order to apply the A-8 preference rating assigned by paragraph (c) (2) and (3), must endorse the following statement on the original and all copies of each purchase order or contract for material, the delivery of which is entitled to such preference rating:

"Purchase order for materials for a mine rated pursuant to Preference Rating Order P-56, Mine Serial No. . . . . Rating A-8. This application of the rating is made pursuant to the terms and conditions of that Order, with which the undersigned is familiar.

. . . . . .

(Name of Mine Operator or Supplier)

By: . . . . . .

(Authorized Signature)"

Such purchase order or contract so endorsed shall be delivered to the seller of such material. Such endorsement shall constitute a certification to the Office of Production Management that the mine operator or supplier is entitled to apply such rating to such delivery pursuant to this order. Such purchase order or contract must be in writing and shall not include any material the delivery of which is not rated pursuant to this order.

(3) A mine operator or supplier placing any such rated purchase orders or contracts and the supplier selling the material covered thereby, must each retain endorsed copies of such purchase orders, contracts notifications and other relevant documents segregated from all other purchase orders or contracts for a period of two years from the date thereof for inspection by authorized representatives of the Office of Production Management.

(f) *Restrictions on Application of Rating*

The preference ratings hereby assigned shall not be applied—

(1) unless the material to be delivered cannot be secured when required without such rating;

(2) to obtain deliveries greater in quantity or on dates earlier than required for the operation, maintenance or repair of mine property or equipment;

(3) by a supplier to obtain material for a delivery by him which has not been rated pursuant to this order.

(g) *Restrictions on Inventory*

No mine operator shall accept deliveries (whether or not rated pursuant to this order) of operating supplies or other material which will increase such mine operator's inventory of such operating supplies or other material to an amount greater than the minimum necessary for the efficient operation of his business, and the ratio of inventory to current production shall in no event exceed the ratio of average inventory to average production for the years 1938, 1939, and 1940.

(h) *Resale of Operating Supplies and Other Material Prohibited*

Except with specific permission of the Director of Priorities, no mine operator shall resell any operating supplies or other materials (whether or not obtained pursuant to rating assigned by this order) except to another mine operator.

(i) *Conservation and Standardization*

Every person affected by this order shall use his best efforts to effectuate conservation of materials by elimination, simplification or standardization of types, sizes or forms, or otherwise, and to cooperate in any program developed for such purpose by the Office of Production Management. The Director of Priorities may from time to time issue specific directions as to conservation, elimination and standardization.

(j) *Relief*

In case the productivity or sound working condition of any mine is adversely affected by any provision or application of this order or by inability to obtain essential operating supplies or other materials, such mine may apply for relief to the Director of Priorities. The Director of Priorities may thereupon take such action as he deems appropriate.

(k) *Records, Audit and Reports*

Each mine operator and each supplier shall keep and preserve for a period of not less than two years accurate and complete records of all transactions affected by this order and shall submit from time to time to audit and inspection by duly authorized representatives of the Office of Production Management. Each mine operator and each supplier shall execute and file with the Office of Production Management or other designated agency, such reports and questionnaires as the Office of Production Management shall from time to time require. Until otherwise directed each mine operator shall file with the designated state agency on or before the 10th day of each month, beginning October 10, 1941, a report of purchases made during the preceding month pursuant to the ratings granted by this order.

(l) *Violations*

Any person affected by this order who violates any of its provisions or a provision of any other order, regulation or other directive of the Office of Production Management may be deprived of priorities assistance, or subjected to such other or further action as the Director of Priorities may deem appropriate.

(m) *Revocation or Modification*

This order may be revoked or modified by the Director of Priorities at any time as to any mine operator or supplier. In the event of revocation, or upon expiration of this order, deliveries already rated purusant to this order shall be completed in accordance with said rating, unless the rating has been specifically revoked with respect thereto. No additional applications of this rating to any other deliveries shall thereafter be made by the mine operator or supplier affected by said revocation or expiration.

(n) *Revocation of Prior Order*

The provisions of Preference Rating Order P-22, in so far as they relate to mines, are hereby revoked. [Quoted from original order.]

(n) *Amendment of Prior Order*

The provisions of Preference Rating Order P-22 shall not apply to deliveries to which a preference rating is assigned by this order. [Quoted from amendement.]

(o) *Effective Date*

This order [and amendment] shall take effect immediately, and unless sooner revoked shall expire on the 30th day of April 1942.

(P.D. Reg. 1, Aug. 27, 1941, 6 F.R. 4489; OPM Reg. 3, March 8, 1941, 6 F.R.1596; E.O. 8629, Jan. 7, 1941, 6 F.R. 191; E.O. 8875, Aug. 28, 1941, 6

F.R. 4483; sec. 2(a), Public No. 671, 76th Congress, Third Session, as amended by Public No. 89, 77th Congress, First Session; sec. 9, Public No. 783, 76th Congress, Third Session.)

Issued this 17th day of September, 1941. [Date of original order; amendment dated September 22.]

DONALD M. NELSON,
Director of Priorities

The OPM requires from each mine for which a priority rating is requested under P-56 the following information:

(a) Name of company operating the mine;

(b) Location of the mine;

(c) Approximate annual tonnage produced;

(d) Average number of employees;

(e) Product produced.

Dr. Nelson has said that OPM's general policy is to issue a separate mine serial number for each mine, although this policy may be departed from where a company has a number of contiguous mines with a common post-office. At least for the present mine serial numbers will be issued only to companies normally employing 10 or more employees, but concerns employing fewer than 10 may present their pleas for mine serial numbers direct to Dr. Nelson. It would be advisable in such cases for the company to present as much documentary evidence as can be assembled to support its claim that it is essential to defense or to important civilian projects. It would also be advisable for all companies regardless of their size to furnish the Emergency Coördinator for Mines in their states with all relevant information regarding important contracts which they may be fulfilling, although it is not necessary to furnish such information as a condition precedent to the issuance of serial numbers. Mine serial numbers have already been issued in some states to some companies. Failure to receive a serial number may be due to clerical difficulties encountered in handling a large number of requests.

A list of the 39 state Emergency Coördinators for Mines already appointed follows:

Alabama—E. J. McCrossin, Phoenix Bldg., Birmingham.

Arizona—C. M. Martin, 1821 E. Jackson St., Phoenix.

Arkansas—George C. Branner, 447 State Capitol, Little Rock.

California—Kenneth R. Fulton, State Capitol, Sacramento.

Florida—Herman F. Gunter, Box 631, Tallahassee.

Georgia—Capt. Garland Peyton, State Capitol Bldg., Atlanta.

Idaho—C. E. Arney, State Capitol Bldg., Boise.

Illinois—Robert M. Medill, State Capitol Bldg., Springfield.

Indiana—Clarence A. Jackson, Board of Trade Bldg., Indianapolis.

Iowa—George Duckworth, State Capitol Bldg., Des Moines.

Kansas—Jeff Robertson, 801 Harrison St., Topeka.

Kentucky—Moss G. Patterson, Dept. of Mines & Minerals, Box 680, Lexington.

Louisiana—J. L. Michaugh, Div. of Mines, State Capitol Bldg., Baton Rouge.

Maryland—John J. Rutledge, State Capitol Office Bldg., Annapolis.

Michigan—Benjamin F. Sparks, State Highway Dept., Escanaba.

Minnesota—Ray Nolan, Hibbing.

Mississippi—Col. Lea B. Robinson, Defense Council, Jackson.

Missouri—John A. Skinner, Mine Inspector, Bureau of Mines, Jefferson City.

Montana—Tom D. Caverly, State Capitol Bldg., Helena.

Nebraska—Blain Yoder, State Capitol Bldg., Lincoln.

Nevada—Matt Murphy, State Capitol Bldg., Carson City.

New Jersey—Meredith E. Johnson, Room 417, State House Annex, Trenton.

New Mexico—John M. Kelly, State Capitol Bldg., Santa Fe.

New York—Miss Frieda S. Miller, 80 Centre St., New York City.

North Carolina—Dr. J. I. Stuckey, State Capitol Bldg., Raleigh.

North Dakota—W. T. Kraft, 315 Broadway, Bismarck.

Ohio—George Strain, Dept. Industrial Relations, State Capitol Bldg., Columbus.

Oklahoma—Ivan Fisher, Miami.

Oregon—Earl K. Nixon, Director, State Dept. of Geology and Mineral Industries, State Capitol Bldg., Salem.

Pennsylvania—Hon. Richard Maize, Commonwealth of Pennsylvania, Dept. of Mines, Harrisburg.

South Dakota—Hon. Harry H. Stewart, Deadwood.

Tennessee—S. E. Bryant, State Capitol Bldg., Nashville.

Texas—Dean John W. Kidd, El Paso.

Utah—Wendell Grover, Industrial Comm., State Capitol Bldg., Salt Lake City.

Vermont—Lester E. Richwagon, State Capitol Bldg., Montpelier.

Virginia—Hon. Thomas B. Morton, State Capitol Bldg., Richmond.

Washington—Robert H. Harlin, State Director, Labor and Industries, Olympia.

West Virginia—Hon. N. P. Rinehart, Chief, State Dept. of Mines, Charleston.

Wyoming—J. M. Sampson, Rock Springs.

On October 18 the OPM issued an amended Preference Rating Order No. P-22, which by the inclusion of additional classifications has been made to embrace those branches of the nonmetallic-mineral industries not classified as mines, such as ready-mixed concrete, concrete products, bituminized aggregates, etc.

Priorities Clinics.—The Priorities Division of the OPM on October 20 announced the first of a series of industrial and regional priorities clinics, designed to acquaint business men with the principles and applications of the priorities system. The meetings will be held under the supervision of the Priorities Division Field Service District Managers. Regional meetings to be held in the field are scheduled for Minneapolis on November 3, Cincinnati on November 5, Indianapolis on November 6, Rochester, New York on November 11, East Orange, New Jersey on November 14, and Pittsburgh, Pennsylvania on November 18. Details may be obtained by addressing the Priorities Division District Managers in the cities named.

Priorities Field Service Offices.—Eighteen new field offices have been opened by the Priorities Division of the OPM, making a total of 34 now in operation. District offices, headed by district managers who are familiar with local industry, are for the assistance of business men and manufacturers in connection with the operation of the piorities system. The addresses of the new offices and the names of the district managers in charge of them follow:

Florida—Jacksonville, George H. Andrews, Hildebrandt Bldg.

Indiana—Indianapolis, Albert O. Evans, Circle Tower Bldg.

Kentucky—Louisville, James T. Howington, Todd Bldg., 4th and Market Sts.

Louisiana—New Orleans, John A. Bechthold.

Maryland—Baltimore, Theodore M. Chandlee, Baltimore Trust Bldg.

Minnesota—Minneapolis, Willard F. Kiesner, Rand Tower Bldg.

Montana—Helena, Oscar A. Baarson, Federal Reserve Bank Bldg.

New York—Buffalo, Paul R. Smith, M & T Bank Building.

North Carolina—Charlotte, J. E. MacDougall, Liberty Life Bldg.

Oklahoma—Oklahoma City, C. F. Aurand, Federal Reserve Bank Bldg.

Oregon—Portland, J. Fred Bergesch, Bedell Bldg.

Tennessee—Knoxville, Dyer Butterfield; Memphis, J. S. Bronson, Sterrick Bldg.; George F. Gillen, 1015 Stohlman Bldg.

Texas—Houston, George L. Noble, Jr., Federal Reserve Bank Bldg; San Antonio, Carl L. Cool, 415 West Branch Place.

Utah—Salt Lake City, Ralph E. Bristol, Utah Oil Bldg.

Virginia—Richmond, Fred T. Wilmer, Federal Reserve Bldg.

Ready-Mixed-Concrete Repairs.—Preference Rating Order P-22 covering repairs was amended October 18 to include, among other classifications, "manufacturing, processing, or fabricating." This change brings the manufacture of ready-mixed concrete, bituminized aggregates, concrete products, and the like within the scope of the order.

Wyoming Firm Will Open Graphite Mine

The National Chemical & Mine Company, Inc., has been formed to operate a commercial graphite mine 15 miles south of Lusk, Wyoming. Production is expected to get underway yet this year. Operations will provide employment for 50 men and approximately $100,000 worth of machinery and equipment is being installed.

Officers of the company are H. W. Herron, Whitney, Nebraska, president; August Eenn, Green Bay, Wisconsin, vice-president, and Leslie McCarthy, Lusk, treasurer.

EDITORIAL

Defense for War—X

BY THIS time it ought to be plain to most people that the "old world"—the state of affairs in which most of us and our immediate ancestors were born and reared—has rather definitely broken down. The phrase "broken down" is a disagreeable one; it suggests the unpleasantness of admitting failure in the age-old attempt to make this world a better place to live in. Even though there has never been any concerted effort on the part of a large section of mankind to better the living conditions of human beings in general, it is common practice to speak of the present "system," the present "economic order," as if these terms actually referred to something that had been planned, either by man or some supernatural power.

One can "systematize" a business concern in the sense that one can lay out its offices, standardize its forms, arrange its operations with definite objectives in mind. One can make a factory efficient by analyzing the operations to be performed in it, by so ordering every step in the manufacturing process that each one will be accomplished with the minimum expenditure of time and effort and so that every machine, every process and every worker will contribute its maximum toward the attainment of a definite end. The result can reasonably be called a "system" or an "order;" the processes are properly described as systematic or orderly.

The conditions in which we, in common with the rest of the world's inhabitants, live can not logically be spoken of as either a "system" or an "order" in the sense that they disclose, on the part of any individual person, group of persons, race or historical aggregate of men, the result of study, planning or conscious arrangement. What man has attained is the result of the application of certain minimum physical and mental qualifications which have functioned and developed within the limitations imposed by a not-too-friendly environment. Most of his progress has come in spite of conscious efforts on his part to delay, if not prevent, it; his attitude toward the improvement of himself and the betterment of the conditions affecting his life has been, in fact, more often negative than positive. We indulge, therefore, in foolish self-deception when we affirm or imply that present-day civilization is to be credited solely to the greatness of the human intellect, and we are equally foolish when we consider as personal affronts the many well-deserved criticisms that have been, and will (we hope) continue to be, hurled at them. It is because so many people believe that we have done the best we could with what we had to work with that they are unable to visualize anything more comfortable, more suitable or more conducive to happiness than what is known to them.

On three continents to-day men are struggling in mortal combat for what they call a "way of life." On one side they fight to preserve the customs and conditions to which they have become habituated. On the other side they fight for the establishment of different conditions—a state of affairs in which they hope for more of the world's material goods, less of its physical hardship, and more of simple contentment. While Britain fights to preserve what has come to be known as the democratic "way of life," one of its allies, the U. S. S. R., struggles in an effort to introduce more widely a new "way of life." Opposed to both, the German people fight to set up yet another "way of life." The British, despite temporary sacrifices of some of the privileges of democracy, pledge their allegiance to the cause of the "four freedoms." Hitler talks freely and carelessly of a "new world order" and of a Reich that shall last a thousand years. Stalin, gayly overlooking the compromises involved in his "new economic policy," says that Russia has "completed Socialism" and is now entering "the final stage of history," full Communism. And we, still sitting on the sidelines, marvel at the stupidity of other peoples who can not or will not see that ours is the true "way of life" for all men.

All these attitudes toward life, regardless of the differences between their ultimate goals, have one quality in common; they are all based on the theories of finality and inevitability. Each of these different ends, if it could only be made world-wide in its application, would represent the last stage in man's historical development; there would be nothing more and everyone would live happily ever after. That is the dogma of finality. Since each of these programs is the one ideally suited to man's craving for security and happiness, its coming is inevitable, so why oppose it and delay the release of man from his shackles? That is the dogma of inevitability.

We Americans display the same lack of logic. We, too, fail to see that the institutions and conditions, the habits and processes of government, which we like to call the American "way of life," are subject to change. We, too, speak of our ideals and objectives, politically as well as economically, as if they represent finality, the last word in human development. We, too, seem to think that it is futile for any other nation to oppose the realization of those ideals and objectives, because their attainment is inevitable.

THERE is grave danger in the adoption and retention of such an attitude. Hitler has led millions to their death by his promises of a "new world order." Japan has made a charnel-house of the Far East with its claim to the right to establish a "new order in Asia." And in each case millions of dupes are induced by the fallacies of finality and inevitability to relinquish everything they have, even life itself, for a shibboleth.

It is important that we should not for one moment forget that only change is inevitable, that there is no such thing as finality. We must be prepared to make and accept changes in our political institutions, in our economic processes, in our habits of thought, not only for the purpose of preparing ourselves to meet, on the basis of parity of efficiency, the onslaughts of potential enemies, but also—what is in the long run even more important—to maintain our belief in the efficacy of thought and in the possibility of continually improving man's physical and psychical stake in life.

View looking north at open pit in old waste dump.

NEW FLORIDA TABLING PLANT RECOVERS PHOSPHATE FINES FROM TAILINGS DUMP

By SPENCER JONES

FOR many years the Florida land-pebble phosphate deposits were prospected and worked by methods which resulted in the loss or rejection of nearly half of the actual tonnage mined. As originally mined, the phosphate pebbles, embedded in a sand-and-clay matrix averaging 10 feet in thickness and covered with about 20 feet of overburden, are gray, white and cream-colored particles which vary in size from colloidal to an inch or more in diameter. The overburden was and is usually removed by large drag-lines and the matrix, with its phosphate pebbles and particles, hydraulically mined and pumped from a sump at the pit to an ore-dressing plant (commonly called a washer).

Here at the washer, handling the matrix as mined, the job is to remove all the clay and then to separate the pebbles and finer particles from the quartz sand. It was in the separation of the small particles of phosphate from the free quartz that the older types of washers ran into trouble. The difference in specific gravity between the two materials is so slight that ordinary gravity concentrating methods are unsuitable and millions of tons of phosphate fines, mostly of minus 20-mesh size, were wasted on the dumps of the older washers.

Many more or less successful methods have been tried, both in washers handling phosphate ore as originally mined and in plants where the material from the dumps is re-worked. Several plants in the field use flotation cells with a reagent treatment; a reaction on the surface of the phosphate particle between the lime in the particle and a fatty or resinous acid (or both); and the addition of a frother to aid in levitation. This method results in excellent recovery, provided that pre-flotation treatment, such as crushing and classification, is able to retain the minus 100-mesh fractions, for the phosphate rock is often soft and crushing produces slimes.

Southern Phosphate Corporation officials are of the opinion that concentrating tables are more appropriate than crushing followed by classification and flotation cells to separate the mixture of phosphate pebble and quartz sand in the minus 20-mesh sizes; that phosphate slimes are (because there is no crushing) not created, hence are not classified out; and that there is much less phosphate loss in the quartz tailings.

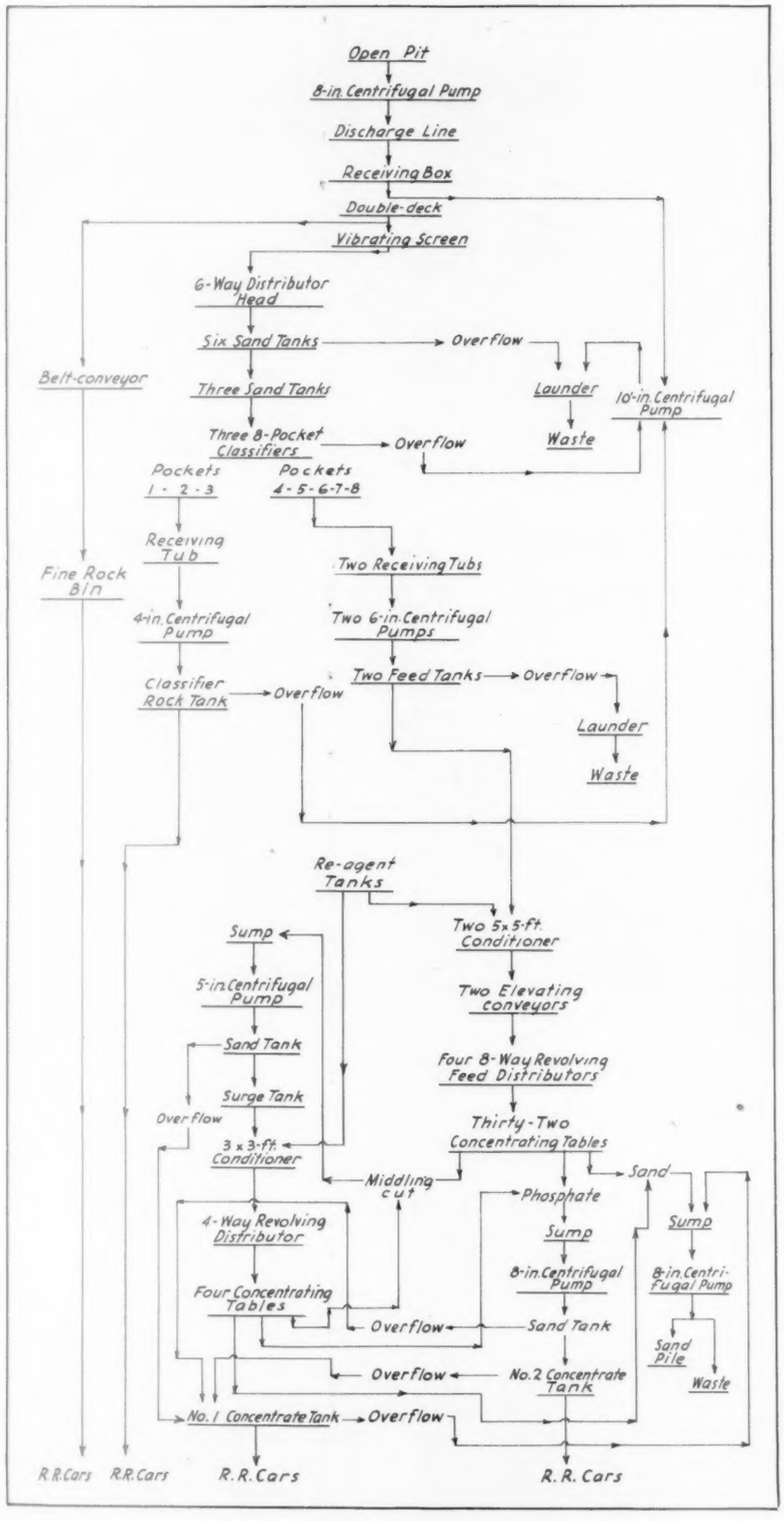
George W. McCleland, general superintendent of mines, does a bit of hydraulicking in the pit.

In 1932 a single standard size of concentrating table was installed experimentally at the corporation's San Gully washer No. 1. The success of this pilot operation determined the design of two succeeding washers, all three washers handling matrix as originally mined. The newest of these three washers, San Gully No. 2, near Lakeland, Florida, was described by W. E. Trauffer in PIT AND QUARRY, September, 1937.

Having determined to its entire satisfaction that concentrating tables provide the right answer for the separation of minus 20-mesh sizes of phosphate particles and quartz sand, the Southern Phosphate Corporation then decided to build a washer and tabling plant for the exclusive purpose of reworking its millions of tons of material contained in the waste dumps of long-vanished washer operations.

At Pauway, Florida, a run-of-mine washer had been in operation from 1925 to 1933. In this now-dismantled washer the smallest screen was about 20-mesh and an 8-year accumulation of phosphate and sand, amounting to about 4,000,000 long tons, and practically all minus 20-mesh, was available.

Here the corporation decided to build its new plant, designed by its officials and engineers. E. S. Tompkins, mining engineer of New York City, prepared the flow-sheet of the washer portion of the plant. Under the supervision of E. A. Pierce, vice-president and manager, a capacity of 250,-



Flow-sheet of the Pauway operations.

000 long tons per year was planned for and a recovery of 90 per cent. aimed at. Structural steel, including two feed tanks, two concentrate tanks, a fine rock tank and a classifier tank, was furnished by Bushnell Lyons Iron Works, Tampa, Florida, and erected by White Construction & Engineering Company, also of Tampa. A concentrator building 52 feet wide, 170 feet long and 12 feet high at the eaves of its ridge roof was purchased from the Maryland Metal Building Company, Baltimore, and erected by Southern Phosphate Corporation labor.

Actual construction started in December, 1940, and the plant was completed and operation started on June 24, 1941, following the installation of concentrator tables and allied equipment by the corporation's own organization. Although a washer is a "temporary" plant to a phosphate company, with a life of 8 to 10 years in a given location, it has been found that the practice of erecting steel structures is economical in the long run because of the ease with which the plant can be dismantled and re-erected at a new location. Hence the substantial construction of the new Pauway washer and tabling plant.

The old waste dump which is being re-worked is about half a mile from the new plant, and is hydraulically mined. The overburden amounts to practically nothing, so no attempt is made to remove the half inch or so of fine top soil. Two Georgia Iron Works Climax nozzles are used at a time, one on each side of the open pit; the sizes are from 1½ to 2½ inches as required. Water for the nozzles at 80 pounds pressure is supplied by a 2,000-g.p.m. Allis-Chalmers centrifugal pump driven by a 150-horsepower Allis-Chalmers motor. Naylor 8-inch spiral-weed pressure pipe (with steel flanges welded on) serves each hydraulic gun. Incidentally, all the motors of 25 horsepower and larger are operated on 2,300-volt, 3-phase, 60-cycle alternating current, and all the smaller motors are operated on 220-volt, 3-phase, 60-cycle current.

At the lowest point in the open pit is a suction well or improvised sump, into which the screened head of a 10-inch rubber suction line is sunk, and which is carefully watched and kept from clogging by a "suction man", who uses a block and fall to raise and lower the suction head as needed. An 8-inch Georgia Iron Works volute type centrifugal sand pump, driven at 720 r.p.m. average by a variable-speed 150-horsepower motor, discharges the fluid mixture from the suction line into an 8⅝-inch o. d. steel discharge line which runs up over the edge of the pit, along the surface of the ground and then on trestle bents to the lower part of the washer, thence vertically to the highest point of the washer, where it empties into a steel receiving box. This pipe was supplied by Spang-Chalfont, Inc., of Pittsburgh.

Although the material in the waste dump is theoretically minus 20-mesh, there is a small amount of oversize included, that which is plus ½-inch being gangue of no value, but that which is minus ½-inch plus ¼-inch being

largely phosphatic and worth saving. So the fluid mixture runs from the receiving box a 5-foot by 12-foot double-deck Robbins Gyrex vibrating screen with ½-inch-square wire mesh on the top deck and ¼-inch square wire mesh on the bottom deck. The oversize material scalped off the top deck is wasted. Material passing through the top deck, but rejected by the ¼-inch mesh of the bottom deck, is chuted to a Link-Belt belt-conveyor which drops it into a 200-ton fine-rock bin, from which it is periodically chuted into railroad cars and hauled to the corporation's permanent drying plant.

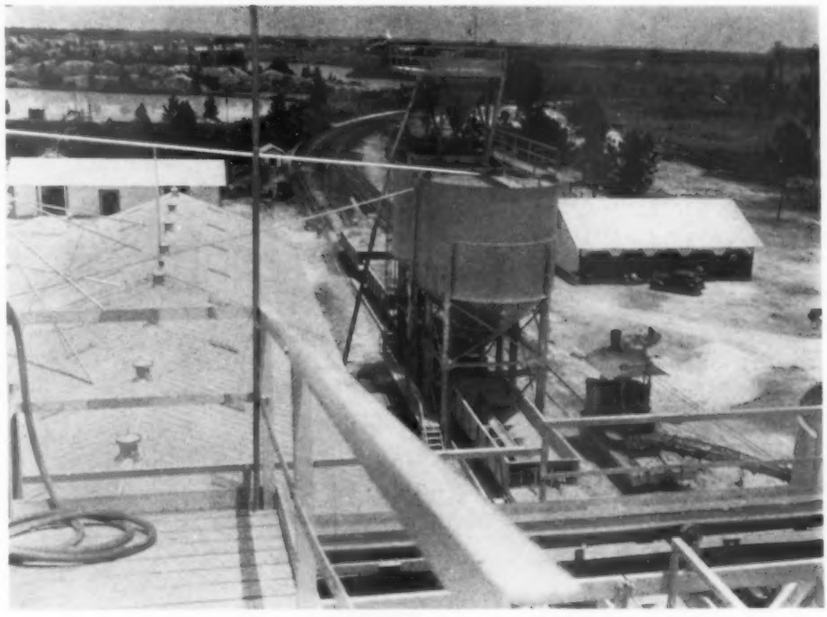
It is the material passing through the ¼-inch bottom deck of the vibrating screen which is the principal concern of this article. This material, a mixture of water, clay, quartz sand and phosphate particles, must first be freed of its clay slime and fine sands. It is therefore discharged through the bottom deck of the vibrating screen into a receiving pan, at the sides of the bottom of which is a 6-way distributor head designed by George W. McCleland, general superintendent of mines for the corporation.

The distributor head feeds six 10-foot by 10-foot float-controlled Allen sand tanks purchased from the Tompkins Mining Machinery Corporation. The overflow from these tanks, consisting of water, clay slime and fine sand, flows down launders to a distant waste pile. The material discharged from the bottoms of these six tanks flows through chutes into three 6-foot by 6-foot float-controlled Allen tanks, which are really used more as "surge" tanks than as cleaning tanks.

Each of these three Allen "surge" tanks discharges into an 8-pocket Fahrenwald classifier for hindered-settling classification. The overflow from the three classifiers, a mixture of water, clay slime and fine sands, is pumped to waste. Pockets Nos. 1, 2 and 3 of the classifiers all discharge into a steel receiving tub, from which the material (all plus 28-mesh) is pumped by a 4-inch Wilfley centrifugal pump, driven by a 30-horsepower, 1,200-r.p.m. GE motor into a 200-ton classifier rock tank. The turbid overflow from this classifier rock tank is pumped to waste, while the plus 28-mesh material is periodically chuted out of the tank into railroad cars and hauled to the central drying plant. This material and that passing over the ¼-inch mesh of the vibrating screen and discharged into the fine-rock bin are both fairly pure phosphate.

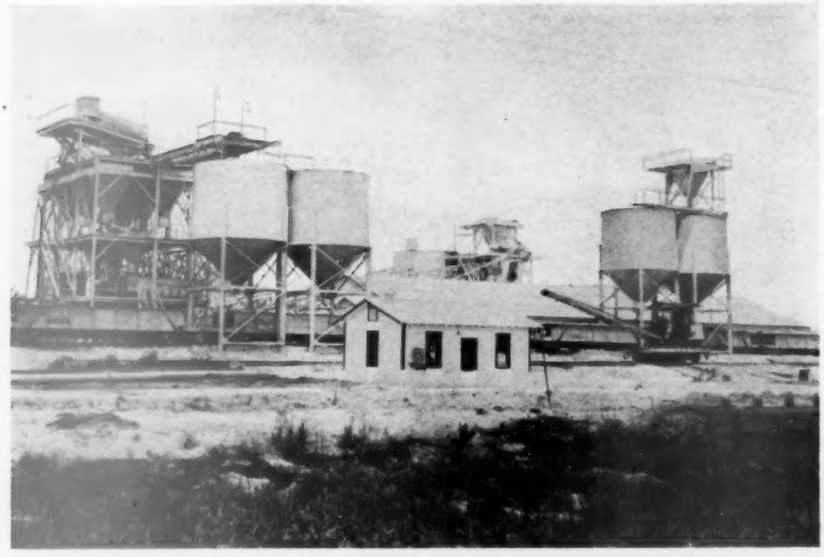
Pockets Nos. 4, 5, 6, 7 and 8 of the Fahrenwald classifier discharge into two receiving tubs and it is this material which was formerly all wasted.

One of the hydraulic nozzles in operation.



View looking northeast from top of washer. Two concentrate tanks with sand tank above in center.

Washing plant showing battery of sand tanks.



General view of washer, tabling plant and finished-product tanks.

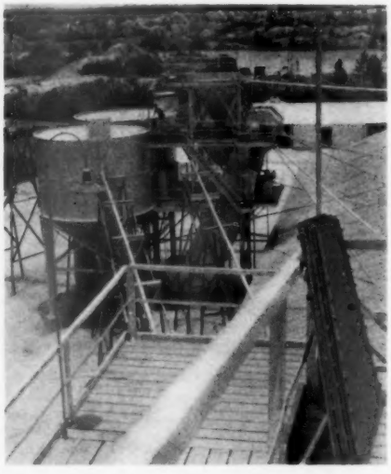
Double-deck screen at the washer.

The plus 28-mesh material and the plus ¼-inch material could have been captured when the matrix was first worked, but somehow they slipped through to the waste dump. There was, however, no profitable way, prior to 1932, of separating the smaller phosphate particles from the free quartz sand of practically identical specific gravity.

From the two receiving tubs, then, this formerly-wasted mixture of water, phosphate particles and quartz sand is carried through two 6-inch Wilfley centrifugal pumps, driven by 50-horsepower, 900-r.p.m. GE motors, via a 6-inch pipe-line to two 300-ton feed tanks beside the tabling plant. The slightly turbid overflow from these tanks runs down launders to the waste pile.

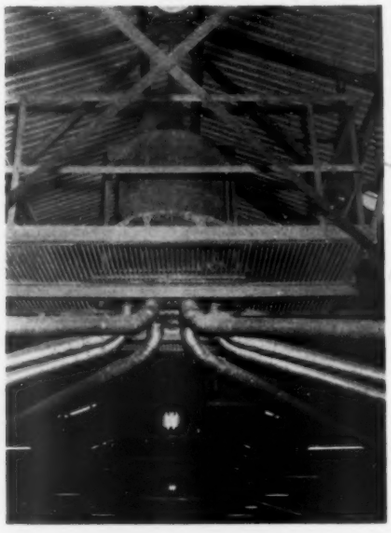
Now the actual concentration process begins. Beneath each feed tank is a 5-foot by 5-foot Denver conditioner. Each of the two Denver conditioners is supplied with caustic from one of two 300-gallon caustic head tanks, the caustic, from drums, being mixed in a "Lightnin' " portable mixer powered as to its steel propellers with a ¾-horsepower motor. The caustic is used in a 10-per cent. solution. From a 20,000-gallon fatty-acid storage tank and a 15,000-gallon light-gravity fuel-oil storage tank, two float-valve-controlled Tuthill pumps (powered by 1/6-horsepower GE motors) feed two 300-gallon fatty acid-fuel oil head tanks from which the Denver conditioners are supplied. The rate of feed of the reagents—the caustic, fatty acid and fuel oil—is controlled by manually-operated valves at the conditioners.

In these conditioners, which are steel tanks with vertical propeller shafts and 15-inch propellers driven at 325 r.p.m. by 7½-horsepower GE motors through V-belts, the phosphate-and-sand mixture from the feed tanks is mixed with the reagents in the proportions of 1½ to 2 pounds of fatty acid, 2 to 4 pounds of light-gravity fuel oil, and ½ pound of caustic soda (in 10 per cent. aqueous solution) per ton of feed. Water is added during the mixing to dilute the feed pulp to 50 to 60 per cent. solids. The object of this "conditioning" is to make it possible to oil the phosphate



View showing feed tanks, conditioners and reagent tanks.

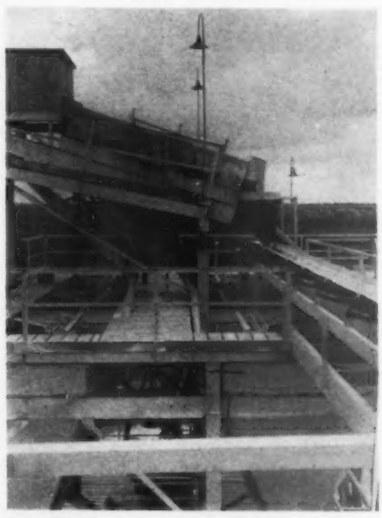
particles so that air bubbles (created by the rapidly-rotating propeller) will stick to them, with the quartz sand remaining unaffected. When the mixture of water, bubble-covered oiled phosphate particles and quartz sand is passed over concentrating tables the artificially-lightened phosphate particles agglomerate and float over the side of the tables and away from the quartz sand.



Eight-way revolving feed distributor in concentrator building.

Open-top launders which handle discharge from sand tanks.

The "conditioned" feed pulp is carried up by two Link-Belt elevating conveyors, one from each conditioner, to two sets of Y's of "pairs of pants," each branch of which feeds an 8-way Concenco heavy-duty revolving distributor. These four distributors, driven by GE gear-head motors, are supported inside the center panels of the roof trusses of the fluorescent-lighted con-



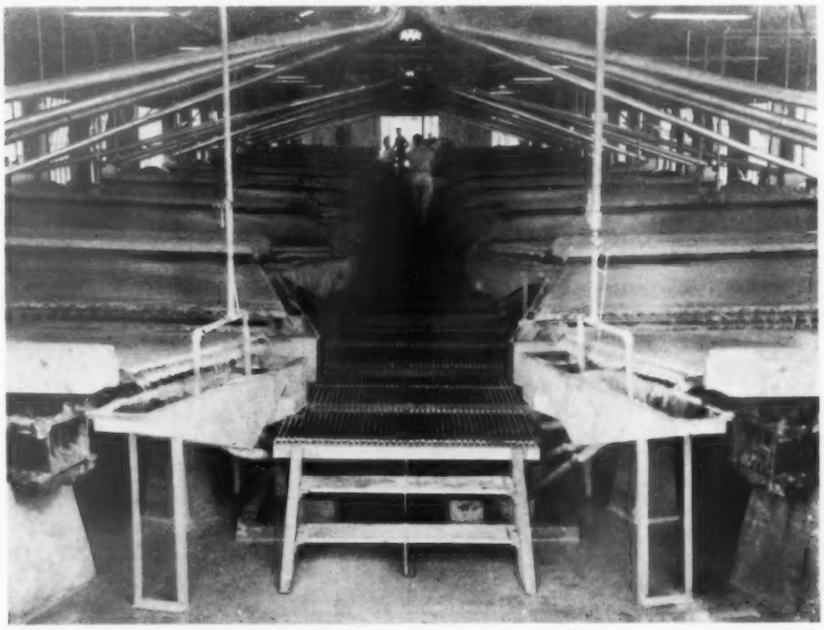
Another view of the screen with six-way distributor below.

centrator building. Here, too, water is added again to dilute the feed pulp to 30 per cent. solids.

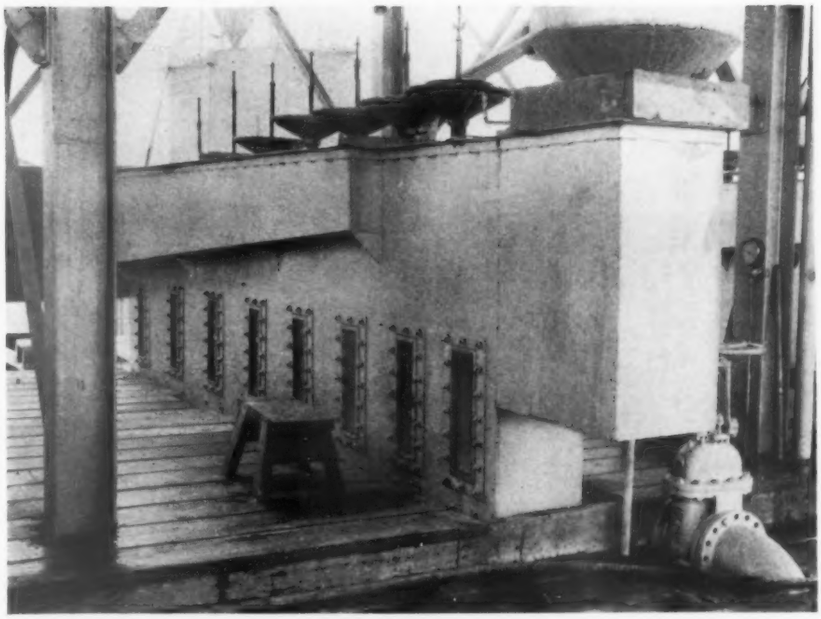
Thirty-two 4-inch diameter pipe launders, with a slope of 4 inches to the foot, convey the diluted feed pulp from the four distributors to 32 No. 6 Deister Super-Duty 6-foot by 15-foot diagonal-deck concentrating tables, each of which is powered with a 2-horsepower GE motor. The deck covering is masonite tempered Prestwood. Oak riffles, 5/16-inch wide and tapering from ¼ inch at the head-motion end to ⅛ inch at the terminal end, are spaced 1½ inches apart. Every eighth riffle is a pool riffle and is 1/16 inch higher than the others. The riffles in the dressing zone are 1/16 inch high and untapered. Each table vibrates at 290 cycles per minute. The transverse slope each way is about ¾ inch per foot; that is, the high spot of a table is the corner on which the feed pulp is first fed.

Ore-dressing water is fed to the tables along the long side which runs up to the feed corner and, after the water and the transverse slope of the tables are properly adjusted, the phosphate particles wash across the riffles and discharge along the opposite long side, falling into a launder beneath this side. The quartz sand is caught between the riffles and gradually jiggled downgrade to the lower short end of the table where it, too, falls into a launder.

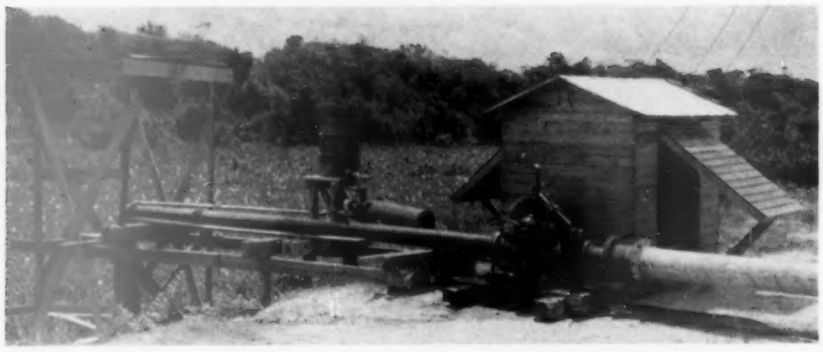
No matter how carefully the feed pulp is treated in the conditioners, there is always some phosphate which is not oiled or sufficiently bubble-covered. For this reason the concentrator separation of phosphate particles and quartz sand is not complete. There is a small amount of phosphate which falls off the table at the lower corner of the sand-discharge end, and a much



General view in concentrator building.



One of the three classifiers.



Pump-house which supplies water under pressure for hydraulicking.

smaller amount of sand which is still mixed with the phosphate falling off the lower end of the phosphate-discharge long side. In other words, there are middlings produced.

The open launders along the long discharge side, therefore, which carry the phosphate particles to pipes which lead to a concrete sump pit, convey a trifling amount of sand, so small in proportion as to be practically negligible. But the launders which receive material from the short, or sand-discharge end, are divided with movable partitions to take a "middling cut" of that portion of the discharged mixture which is sufficiently rich in phosphate particles to be worth reconditioning. This "middling cut" is made empirically along 6 to 10 inches of the sand-discharge end so as to catch discharged material which is too rich in phosphate to be wasted yet too sandy to be shipped out as finished product.

Material caught in the "middling cut" is carried through pipes to a concrete sump pit whence it is pumped through a 5-inch Wilfley sand pump, direct connected to a 50-horsepower, 1,200-r.p.m. GE motor, to a 10-foot by 10-foot Allen sand tank. The overflow from this sand tank carries off the rich "float rock" and goes by gravity down a 6-inch pipe to No. 1 concentrate tank, which will be described later.

Material discharged from the bottom of the Allen sand tank goes by gravity into an equalizing, or surge tank, and thence to a small (3-foot by 3-foot) elevated Denver conditioner with a 12-inch steel propeller driven at 405 r.p.m. by a 3-horsepower motor. In this small conditioner—more properly a re-conditioner—the necessary additional reagents are added from the reagent head tanks previously described. The reconditioned material then flows by gravity to a 4-way Concenco Heavy-Duty revolving feed distributor in the concentrator building and is fed to 4 Deister concentrator tables exactly like the 32 others previously described, even to the provision for taking a "middling cut".

The properly-separated phosphate particles, caught in the phosphate-discharge launders at all 36 concentrating tables and carried through pipes to a concrete sump pit, are then conveyed through an 8-inch Wilfley pump, direct-connected to a 100-horsepower, 1,200-r.p.m. GE motor, to still another 10-foot by 10-foot Allen sand tank for dewatering. The overflow from the sand tank, which carries "float rock", the richest of all phosphate particles, goes to a 200-ton No. 1 concentrate tank by gravity *via* a 10-inch pipe, which feeds under the water level of the tank. This No. 1 concentrate tank is baffled to minimize turbulence. The overflow from No. 1 concentrate tank flows through a pipe to the concrete sump pit into which waste sand is discharged from the sand-catching launders of the concentrating tables. An 8-inch Wilfley centrifugal sand pump, direct connected to a 125-horsepower, 1,200-r.p.m. GE motor, discharges the waste sand and the overflow from No. 1 concentrate tank *via* an 8-inch pipe to the tailings dump, at which point the 8-inch pipe empties through a sand-catching device—a set of bottom vanes which scalp the larger, heavier particles off the under side of the swiftly-flowing mixture of sand and water. This waste sand is well cleaned and uniformly sized and brings a good price as building sand.

The phosphate particles which remain in the baffled No. 1 concentrate tank are called "float rock," are the most valuable per ton of the plant's finished products, are periodically loaded into hopper-bottom freight cars, lined over their bottoms with burlap sacks to prevent loss of contents, and are hauled *via* the Atlantic Coast Line to the permanent drying plant.

View showing feed tanks, conditioners and reagent head tanks.

Inside the pump-house. Fluorescent lighting is used in all plant buildings.

Six-way distributor head which diverts screen throughs to sand tanks.

The dewatered phosphate particles which sink in the Allen sand tank are carried by gravity to a 200-ton No. 2 concentrate tank, which is periodically emptied into hopper-bottom cars, and the No. 2 concentrate material is shipped to the drying plant in the same manner as the No. 1 concentrate.

Water for the plant recirculates *via* a series of interconnected ponds and canals from the washer's somewhat distant tailings dump to a double-screened intake basin in front of the plant. An extension of one of the canals carries water past the plant to the suction basin of the hydraulic mining pump at the open pit in the old waste dump which is being re-worked.

Two pumps draw from the suction basin at the plant. One of these is an Allis-Chalmers centrifugal, direct-connected to a 60-horsepower Allis-Chalmers motor, and furnishing water at 25 pounds per square inch at the rate

of 4,000 gallons per minute against a 50-foot head. The other is also an Allis-Chalmers synchronous motor and supplies 2,000 gallons per minute at 80 pounds per square inch pressure against a 160-foot head.

The recovery of the new Pauway washer and tabling plant is almost exactly what it was planned to be—90 per cent. The tonnage yield of fine rock and classifier rock (minus ½-inch plus ¼-inch and plus 28-mesh, respectively) is barely enough to make its recovery profitable—rather a compliment to the efficiency of the old washer. But table-plant recovery (which is the reason for erecting the new plant) is at the rate of about 30 long tons of phosphate particles per hour, with an

Controls for the feed pumps and classifier rock pump.

average bone-phosphate-of-lime content of about 76 per cent. Out of 3 long tons of phosphatic sand fed to the concentrator tables, approximately 1 long ton of finished product is shipped to the drying plant. Material wasted from the tables analyzes less than 7 per cent. bone phosphate of lime, compared to the 30 per cent. contained in the material fed to the tables.

Analyses are based on samples of the

Workman adjusting one of the movable concentrator partitions.

Some of the pressure piping and valves.

finished products grabbed as the railroad cars are loaded; on samples, obtained by a hand-operated sample cutter at 30-minute intervals, of the table-plant feed pulp just before it enters the conditioners; and samples of the table-plant waste, obtained by a General Engineering Company automatic electric sampler. Samples gathered during each 8-hour shift are sent to the Southern Phosphate Corporation's chemical laboratory at Ridgewood, near Bartow, where the permanent drying plant is located.

The Pauway pit washer and tabling plant is operated in three shifts, 24 hours per day, with 20 men employed on each shift. All the finished products are moved daily *via* the Atlantic Coast Line to the corporation's drying plant at Ridgewood, about 5 miles west of Bartow, the county seat of Polk County, Florida, and about 7 miles southwest of Pauway. From Ridgewood the dried and finished phosphate is shipped by railway direct to interior points and to port for consumption in both domestic and foreign markets. About 90 per cent. of it is used for making "superphosphate", one of the principal ingredients in commercial fertilizers.

The officers and officials of the Southern Phosphate Corporation are: Chester A. Fulton, president; E. A. Pierce, vice-president and manager; C. N. Becker, assistant manager; George W. McCleland, general superintendent of mines (also directly in charge of the new Pauway washer and tabling plant); Harry T. Pierce, mining superintendent at San Gully; E. J. Purcell, assistant mining superintendent; and J. L. Sheppard, civil engineer. The home office of the corporation is in Baltimore, Maryland.

Prospects Improve for Lime Industry

By "ONLOOKER"

Headlines in daily press notices, radio comments and governmental reports all publicize the urgently needed defense materials, such as steel, aluminum, lumber, chemicals, rubber, etc. It is good that emphasis be placed on these strategic essentials. It brings home the consciousness that America is endowed with a wealth of natural resources, which if produced in adequate quantities in the shortest possible time will be the means to an end—the end of a monsterphobia delirium of the Axis forces.

Unheralded, unsung, the lime industry digs in to do its share in this important job of making ready to defend our principles, our manner of life, our whole being. When we stress the importance of the strategic supplies needed to accomplish our present aims, how very little thought or publicity is given to our product "lime" and the key position it holds in agriculture, building, and industrial chemistry. Lime, aptly referred to as the "queen of bases" because of its inherent qualities and adaptability to manifold processes, is very important, an "essential" in our present responsibility of being the "arsenal of democracy." In agriculture its use fosters the healthy and abundant growth of needed food products. In the construction industry it provides the "bond that ties," not only the physical units which make up the individual structures, but to provide the unity of thought and purposeful endeavor which home building and industrial expansion signify. In chemistry and industry lime again affords a wide range of usefulness in over a hundred processes; as a fluxing medium for steel and aluminum manufacture; for the production of paper pulp and its important derivative, cellulose; in the production of explosives, gases, oils, gasoline, chemicals, and, last but not least, in the preparation of pharmaceuticals, food products and a myriad of other essentials too numerous to mention.

Our industry, struggling to maintain its position during the past decade, has under pressure of the present era of world-wide uncertainty responded in no uncertain manner. It has adequate production facilities, quality of product and the will and spirit to do all that is necessary toward achieving our goal.

It is the justified hope that the momentum gained during the past and present will be reflected in the future activities of the lime industry, that it will present a united front, looking up and standing equal to other industries whose common interests are as one.

Hard Surfacing Saves Money for This Enterprising Crushed-Slag Producer

Figure 1. Shovel loading car at slag-dump.

Figure 2. A view of the plant.

PRACTICALLY all the machinery and equipment used in the pit-and-quarry industries constantly presents a potential loss through breakdown and wear. The welding processes offer an economical solution. Breakdowns can be quickly repaired by welding and service restored in a comparatively short time. Worn parts and machines can be made as good as or better than when new by the application of hard-surfacing materials. The scrapping of equipment is seldom necessary and, especially during the present emergency when equipment is difficult and often almost impossible to obtain, more and more operators are turning to the welding processes to solve their problems.

Typical of the many operators who have made extensive use of welding in the maintenance of their equipment is the Illinois Slag & Ballast Company of Chicago. This company processes blast-furnace slag obtained from the dump of the Wisconsin Steel Company on Chicago's far south side. It also operates a slag-crushing plant at Joliet, Illinois, and maintains a separate machine, repair and welding shop in Chicago to service both its processing plants. The major share of the finished product is sold for railroad ballast.

Figure 1 shows the face of the dump and the locomotive and car used in transporting the slag to the processing plant. The numerous iron "skulls" which have been dug out of the bank and thrown aside are plainly visible. These large pieces of iron and many smaller pieces are rejected both at the dump and by magnetic pulleys at the plant and are reclaimed for use by the steel company.

The Chicago processing plant is shown in Figure 2. The raw slag is brought in on the elevated track at the extreme left and the crushed-and-sized material is loaded out into railway cars or trucks in the three loading tunnels at the right.

Figure 3 shows the type of tooth and tooth base used on the shovel dipper for digging and loading at the dump. Note that the tooth bases have ferrules on the end, which have been surfaced with coated Stoody self-hardening rod. Figure 4 shows one of the company's welders at work on one of the ferrules. By using this ferrule the tooth base is prevented from splitting and, as the ferrule is hard-surfaced, it is a simple matter to remove it from the base and resurface it when required.

Figure 5 shows the material as it enters the plant and passes over a scalping screen. Figure 6 shows one of these screen plates after hard-surfac-

Figure 3. Dipper teeth after reclamation.

By J. C. MENZIES, Welding Engineer, C. E. Phillips & Company

Figure 4. Welder at work.

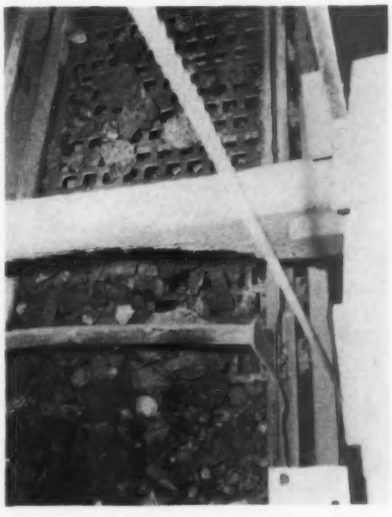


Figure 5. Rebuilt screen cloth in use.

ing has been applied. This is a carbon-steel plate perforated with 2¾-inch square holes. The plate was first bolted to a heavy face plate and several copper blocks 2⅜-inch square were inserted in the holes. The difference in the size of the holes and the size of the copper blocks left a 1/16-inch opening between the blocks and the steel. Using the electric arc, the welder deposited coated Stoody self-hardening rod around the blocks and the molten metal was allowed to flow against the copper block and fill the 1/16-inch opening, leaving a bead around each copper block. The next step is to surface the bridge between the blocks. When a part of the screen had been treated in this way the copper blocks were removed and the correct openings in the screen were retained, the blocks being used merely as dams to obtain this result. On this particular job the life of an ordinary heat-treated scalping screen had been about 90 to 120 days. The first hard-surfaced screen was installed in the spring of 1939 and is still in service and shows practically no wear! Other screen plates with openings 1 inch or more in size are also hard-surfaced in this manner.

The oversize from the screen passes to a gyratory crusher (Figure 7), which has the usual manganese-steel mantle and, due to the excessive abrasion of the slag and iron particles, requires some rebuilding each season. When this crusher head was first rebuilt in 1937, it required the following material:

	Pounds
Stoody high-carbon rod	254
Stoody coated manganese	219
Stoody coated self-hardening rod	120
Coated Stoodite	20
Total	613

Since that time it has never been necessary to apply more than 100 pounds of material in any season and in most cases it was considerably less.

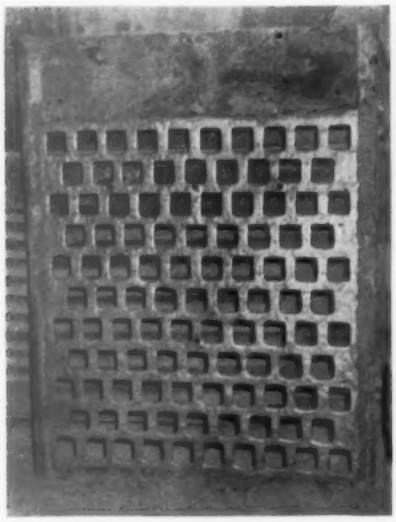


Figure 6. Screen plate after rebuilding as described.

Figure 7. The gyratory crusher which is rebuilt each season.

After the slag has passed the gyratory crusher, in closed circuit with the screens, it is carried up to the bins by a system of elevator buckets. Figures 8 and 9 show the hard surfacing on the lips of these buckets. The item of salvage on these buckets alone is considerable as the wear is almost entirely on the lips. Now they are reclaimed by welding in sections of new metal and the lips are surfaced with coated Stoody self-hardening rod. The shop view,

Figure 8. Bucket-elevator in operation.

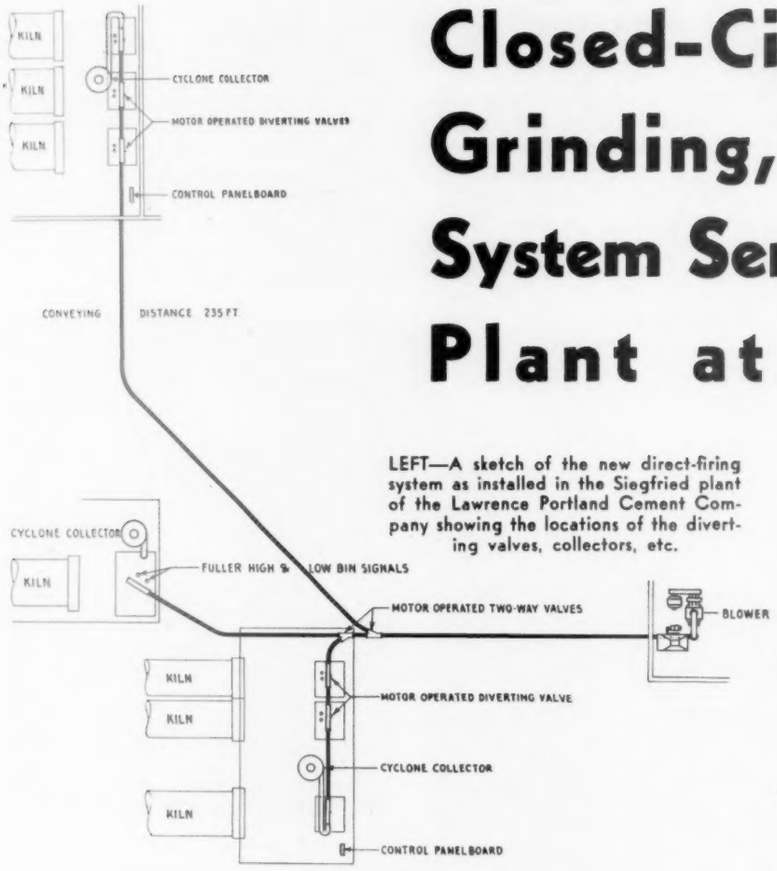
Figure 9. Buckets in the shop showing hard-faced lips.

Figure 9, shows how this piece of new metal is inserted and where the hard-surfacing material is applied.

There are, of course, many other places in the plant where hard surfacing has proved profitable. Figure 10, for example, shows a pair of manganese racks and a pinion used on the shovel dipper stick. The teeth on both these racks become badly worn and it is a simple matter to return these to size with Stoody manganese rod and surface them with coated Stoody self-hardening rod to resist future wear.

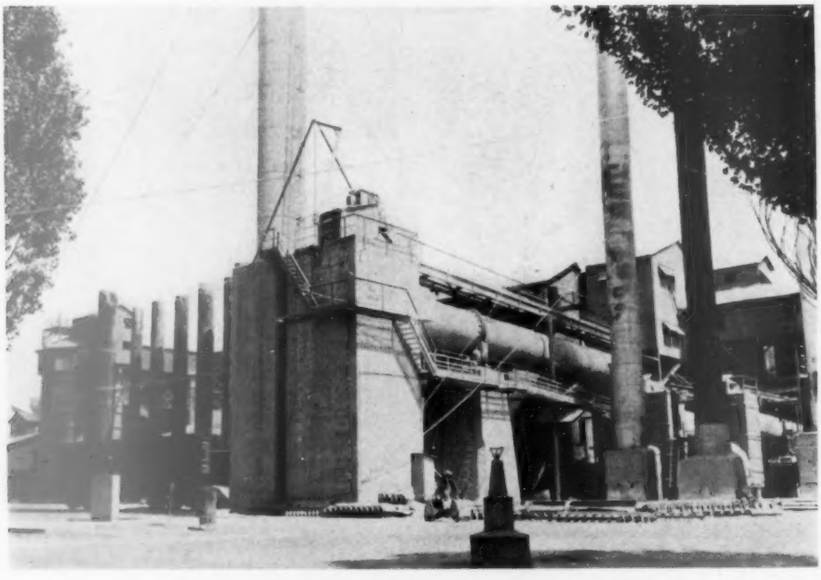
(Continued on page 54)

Closed-Circuit Finish Grinding, Unit-Firing System Serve Lawrence Plant at Siegfried



LEFT—A sketch of the new direct-firing system as installed in the Siegfried plant of the Lawrence Portland Cement Company showing the locations of the diverting valves, collectors, etc.

ONE of the most recent of the growing number of cement plants in which direct-firing coal mills have been installed on kilns is that of the Lawrence Portland Cement Company at Siegfried, Pennsylvania. Like many another plant in the Lehigh Valley this one really dates back. The original plant at this site was built in 1889 but only a few foundations remain. The present plant was built in 1898 but many changes have been made since that time. There are 12 kilns in this plant, all of which are in operating condition. The original kilns, Numbers 1 to 5, had not been used for some years but were recently put back into operation. These and kilns 6 to 8 are still connected to the old bin system of coal firing but Number 30 Whiting direct-firing coal mills are to be installed on three of these kilns during the coming winter.



This close-up view of the plant shows some of the kilns.

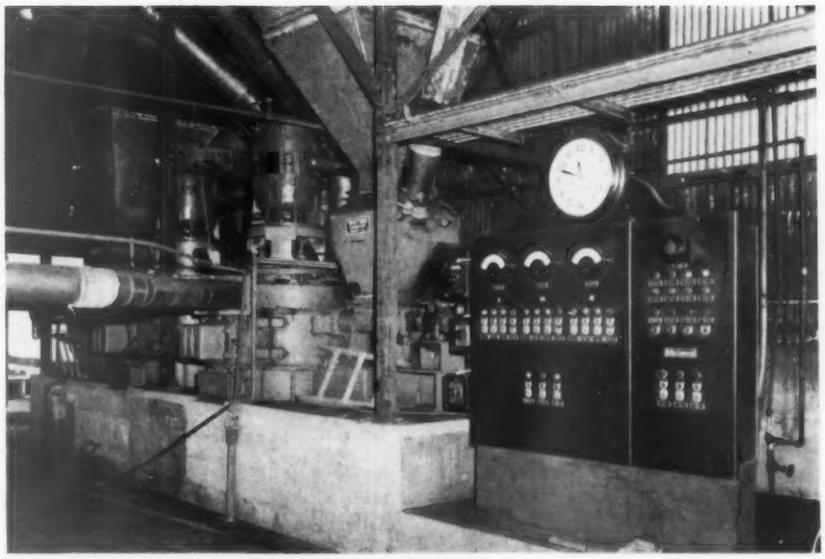
Kilns 9, 10, 11 and 12 are equipped with Whiting direct-firing coal mills which went into operation late in May of this year. These four kilns represent about 40 per cent. of the burning capacity of the plant and when demand exceeds these figures as many of the older kilns are operated as is necessary. Kilns 9, 10 and 11 are respectively 9½ by 8 by 150 feet, 7 by 6 by 150 feet and 8 by 150 feet and each is connected to a Number 40 Whiting mill. Kiln 12 is 9½ by 8 by 180 feet and is connected to a Number 60 Whiting mill. No accurate figures are yet available but, according to Marion S. Ackerman, Jr., plant manager, these mills have accounted for an appreciable fuel saving and some increase in capacity. A longer flame and a more uniform burning temperature have resulted and the cement quality and uniformity have also been improved. The power saving is also considerable and will be increased when the operation of other mills allows the dismantling of the old coal department.

The coal used in this plant is discharged from cars on a trestle into a hopper. After passing through a roll-crusher it is discharged on a pan-conveyor. Coal for the direct-firing mills is discharged into one of two 70-ton concrete storage tanks. Coal for the kilns not equipped with direct-firing mills goes through a drier before going to the other tank. It is then passed through a Pyrator and a Fuller-Kinyon pumping system transports it to the feed bins for kilns Number 1 to 8.

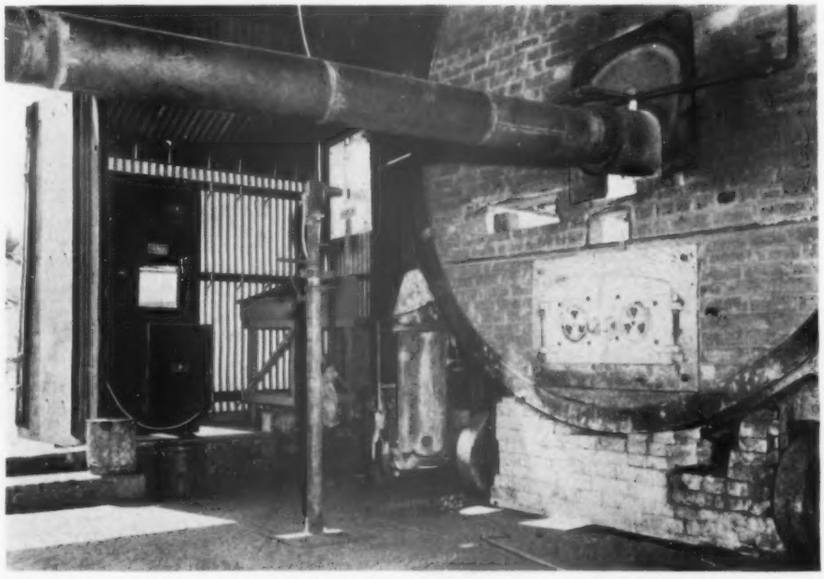
The coal for the direct-firing mills is fed from its tank to a Fuller Airveyor system with a Roots-Connersville constant-pressure blower. In the Airveyor line is a Fuller 2-way valve which feeds either to kilns Number 9, 10 and 11 or to kiln Number 12. The latter line will be extended to the bins of kilns 6, 7 and 8 when their mills are installed. Over the bins of kilns 9 and 10 are the same type of Fuller hinged 2-way valves

which were described in the article on the plant of the Coplay Cement Manufacturing Company in the July, 1941 issue of PIT AND QUARRY. This company has a similar coal-mill installation.

The Lawrence installation is also controlled automatically through a special Fuller control board and Fuller upper- and lower-level indicators on the four 8- by 8- by 18-foot coal-mill feed bins. On this board are push-button and automatic switches for every motor in the circuit and a chart with signal lights which indicate the flow of coal at all times. This system fills a bin to its capacity and then automatically switches the coal feed to any other bin which may have gone below the indicator level in the meantime. If no coal is required in any of the other bins the entire system is automatically shut off and does not start again until another bin is nearly emptied. Only part of one man's time is required to unload the coal for this system. The kiln burners watch the control board in addition to their other duties.



The direct-firing coal mills for kilns Number 9 and 10, with control board at right.



The Number 11 kiln hood with electrical pyrometer, recording and regulating meter at left.

The Number 11 kiln has a G. E. electric recording pyrometer which automatically changes the rate of raw-mill feed and the speed of the kiln to maintain an even burning temperature. The other kilns are controlled by the burners but are checked periodically with a Leeds & Northrup direct-reading, potentiometer-type optical pyrometer.

At the same time the four kiln-firing mills were installed a Number 3A Whiting direct-firing coal mill was connected to the 11- by 75-foot rotary stone drier in the crusher department. This mill fires the drier through a "Dutch oven." It is not connected to the Airveyor system but has a hopper which receives coal direct from cars.

In 1940 the clinker-grinding department of this plant was improved by the installation of three 16-foot-diameter Sturtevant separators. These operate in closed circuit with nine Number 16 Smidth 5½- by 22-foot tube-mills. A 20-inch-diameter by 120-foot long Link-Belt cross screw-conveyor collects the material from all the mills and a Link-Belt fully-inclosed chain-bucket elevator feeds it to the 20-inch by 48-foot distributing screw-conveyor. Manually-operated gates control the feed of this material into the three separators. The feed to each separator is kept equal by watching ammeters connected to the separator motors. The rejects from these separators are collected in a screw-conveyor followed by a bucket-elevator to the top of the mill-feed tanks. The steady return flow is fed back into the nine mills in equal proportions.

The finished cement from the three separators is carried by a 16-inch-diameter screw-conveyor to an 8-inch Fuller-Kinyon pumping system which discharges it into storage. A Norblo dust collector is connected to the tube-mills and to the conveying systems.

Water Permeability of Masonry Walls

The effects of weathering exposure on the water permeability of about 100 small masonry walls exposed outdoors at Washington, D. C., for a period of two or three years are set forth in Building Materials and Structures Report BMS76 which has just been released by the National Bureau of Standards.

The permeability of the walls was determined both before and after outdoor

The three 16-foot separators in the clinker-grinding department with collecting screw and pump below.

Pulverizer which direct-fires the coal drier through a "Dutch oven."

storage by testing them under conditions which produced the effects of a wind-driven rain. Some of the walls that had leaked badly when first constructed had been waterproofed before being exposed outdoors, and the durability of the waterproofing treatments was also observed.

The weathering exposure did not have an important effect on the permeability of all-brick or brick-faced walls that were 8 inches or more in thickness. Stucco-faced walls with tile backings were more permeable after exposure than before, but their performances were still satisfactory. Cutting out and repointing the face joints was the most effective and durable of the waterproofing treatments.

The application of a Portland-cement grout, thinly applied with a brush to the joints of a brick wall, was still effective after three years' exposure although the permeability of the walls, so treated, had increased.

A view of the pneumatic-conveyor system with constant-presser blower in foreground.

Hard-Surfacing *(from page 51)*

New racks would cost several hundred dollars.

Another rather profitable application consists of the fabrication of dipper lips from carbon steel and hard-surfacing

Figure 10. Dipper-stick racks and pinion to be rebuilt.

them with coated Stoody self-hardening rod. This application pertains not only to the power shovel shown in Figure 1, but also to three clam-shell cranes which are used for loading processed slag from stock-piles and rejected tramp iron for return to the blast furnaces. A variety of shafts and pinions are also rebuilt to size through the use of Stoody high-carbon rod. This gives a weld deposit which will not only with-

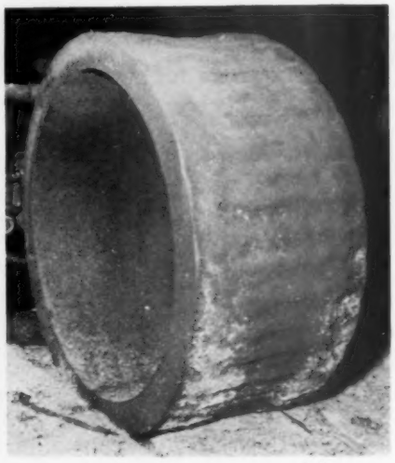


Figure 11. Worn crusher roll awaiting rebuilding.

stand considerable abuse but can be machined as well. Figure 11 shows a crusher roll which is used at the Joliet plant. This is to be rebuilt with Stoody high-carbon rod and coated afterward with Stoody self-hardening rod.

Relationship of Lime Dust to Tuberculosis

The relationship of lime dust to tuberculosis is again reviewed in a short article by Professor Ludwig-Fahn-Weisbaden which appears in the July, 1941, issue of *The Plasterer,* as follows:

"The astounding fact that workers in the lime industry seldom or almost never suffer from tuberculosis may not be generally known. But experience has shown that the inhalation of lime dust reduces the incidence of lung diseases. And, though the exploitation of this knowledge is only gradually coming into popular effect, the possibilities of lime-dust therapy were discussed 50 years ago.

"The evidence of statistics is not less striking. Numerous bulletins published by the owners and directors of large lime works, together with doctors' figures, substantiate our theory. One such report reads: 'In a period of ten years, of the 432 cases of illness among the workers in our plant not one was a case of tuberculosis, inflammation of the lungs, primary catarrh, or pneumonia, and only three were of acute bronchial catarrh. Thus the wholly favorable therapeutic effects of the inhalation of lime dust are patent.'

"The question now arises: in what manner, and in what composition, can the lime dust be most effectively given to the patient. A good many years of experimentation and research were necessary before the Lex-Zehen method was discovered and proved satisfactory. It consisted of a mixture of sulphur and calcium which revealed both curative and preventive properties. It has been used in German sanatoria with good results.

"Two important facts deserve emphasis: first, there has never, according to X-ray observation, been a case of 'dust-lung' in a person who has once been cured by this method; and second, the therapy can be carried on under a doctor's orders without disturbing one's daily occupation."

Trinity Publishes New Booklet on Products

A common-sense study of white cement and pertinent facts about its many uses, are clearly explained in a convenient little handbook just published by the Trinity Portland Cement Company, Dallas.

Tests to evaluate the whiteness of different cements are explained, so that anyone who wants to make his own investigation can do so easily. The company also offers free samples of its cement to those who want to make the suggested tests. Trinity White is now being sold nationally.

Doubling Both Output and Efficiency of Rotary Lime Kilns

By THERON C. TAYLER

THE general reaction to the above heading will be, "It can't be done." The claim of doubled output and efficiency in one step justifies doubt but hardly condemnation if we review the low efficiency records of most rotary lime kilns.

We should be really ashamed of the results that we are getting. Does it not seem ridiculous to waste 70 per cent. of the heat of the fuel? Perhaps we should pause to pay our respects to the few who have pioneered to the extent of reducing the waste to 50 per cent. They have already doubled the efficiency of the average plant. Some have increased their capacity to substantially more than the average; none have doubled the output. I insist that it is now possible, even with our limited knowledge of rotary-kiln lime burning, to reconstruct an existing installation to get both a maintained output of 3 tons of lime per day per square foot of kiln shell cross-sectional area, and a maintained efficiency of 60 per cent.; we should do better. Why then do rotary-kiln lime producers continue to be satisfied to produce only 1½ tons per square foot per day and yet burn enough fuel for twice that output?

Here is the answer. It is common to consider one improvement at a time. There are reasons, as we shall see, why this is neither practical nor economical in the case of the rotary lime kiln. If we install a more efficient lime cooler and cool the lime to a lower final temperature, we recover heat which is normally wasted. This heat increases the temperature of the combustion air and, to a corresponding degree, the flame temperature. Some other change then becomes necessary to prevent overburning the lime and damaging the kiln lining in the hot zone. If we admit excess air for this purpose, we nullify the improvement effected by the more efficient lime cooler. Failures are not conducive to making further changes.

If we insulate the firing end of the shell to reduce the heat loss, we raise the temperature of the lining and make it necessary to lower the flame temperature or buy more expensive liners. If we insulate the feed end of the kiln shell, we merely increase the stack temperature. So it goes for many improvements that are being made at much expense and without results worth mentioning.

If this seems to be a valid reason why none of the specific changes mentioned should be attempted, it is good to make another guess or, better still, to make a careful analysis. The fact is that, having made such alterations, little or nothing is gained until not just one, two or several, but many and certain improvements are completed.

Let us therefore, add to the above changes, a recirculating duct to bring some hot gases from the stack end to the firing end of the kiln. Applied to shaft kilns this is generally referred to as the Eldred system. Let us not be critical about its occasional shortcomings in the shaft-kiln field, but consider it upon its merits for the rotary kiln. One purpose of this improvement is to lower the high flame temperature created by the highly preheated air from an efficient cooler. One effect of this change is to raise the gas temperature at the stack; it increases the length of the calcination zone. A second objective is to make it possible effectively to utilize the increased amount of high-level heat (heat above the calcination temperature) resulting from the improved lime cooler. No other practical and efficient means for control of the maximum flame temperature will make it feasible and effective to extend the calcination zone to 100 or more feet in length. To be fully effective the recirculating gas must be extracted from the kiln at or close to the calcination temperature and be delivered to the flame without appreciable heat loss. Thus we bring the gases to the feed end of the kiln at higher temperatures than is common practice. The kiln is now highly efficient from the lime cooler to the stack, but the increased loss up the latter again nullifies the gains from all the improvements mentioned.

It is obvious that we now need a heat exchanger, a so-called preheater to utilize the heat in the discharged gases to preheat the stone going to the kiln. An extension to the kiln is no substitute for a preheater. The separation of the functions of calcination and of preheating is the most important factor in getting doubled capacity and doubled efficiency from a rotary lime kiln. The break between the kiln and the preheater serves some very important purposes. It provides a convenient means for extracting gases for maximum flame-temperature control; it makes possible the installation of automatic flame-control instruments at the most effective location; it provides means to limit effectively the use of high-level heat for low-level work; it provides a place for the most effective removal of dust and fumes before they absorb any high-level heat; it makes possible the feeding of dry and dust-free stone by weight exactly proportioned to the kiln speed.

With all the improvements installed the high-level heat transfer takes place by radiation in the rotary kiln, the low-level heat exchange is effected by convection in a preheater. The transfer of low-level heat from the gas to the stone is more effective when accomplished by convection than by radiation; more is accomplished by passing the gases through a 2-foot bed of stone than could be brought about by exposure to radiant heat in 600 feet of added rotary.

A preheater, supported by other improvements, will sextuple the stone surface exposed to the heat; it will more than double the time of exposure; it will almost triple the length of the calcining zone; it will require the rotary to operate at close to double speed. Compared to a long rotary, it avoids the large waste of heat from excessive shell surface.

At last, skipping some important items such as seal rings, we have reached the end of a vicious chain. The preheater depends for its results upon all that goes before it and on nothing that follows. The gains will individually, become cumulative; yes, even more than just additive, they multiply.

In their determination to consider but one thing at a time there are those who will propose a consideration of these items in the reverse order. Such procedure is not without some merit. There is one plant in which a preheater, with none of the other improvements herein mentioned, functions to give a quality of product second to none in the United States. In general, preheaters are combined with some other improvement and give to the kiln upwards of 25 per cent. increase in both capacity and efficiency.

Piecemeal improvements are costly and involve complications. As an example, let us assume that enough changes are made to increase the output by 50 per cent., and that the lime cooler was not included in the list of changes. Then an old and inefficient cooler is called upon to cool 50 per cent. more lime than before. Naturally the lime leaves at a much higher temperature, partly nullifying gains made by the other improvements as well as, perhaps,

creating a new operating problem.

To be able to double output with no increased purchases of fuel, to be more certain of maintained maximum quality, and to lower the capital outlay per ton of output may seem to call for immediate action.

However, we now have a new problem to consider, the national emergency. Unless there is a need for more lime in some form by defense industries or for substantial conservation of fuel, any action by lime producers may best be deferred until needed materials can be obtained without adversely affecting war industries. Whatever action we take now, let it be in the interests of national defense.

Gravel Plant's Business Grows Without Benefit of Railroad

THE Duck Island Gravel Company, located 30 miles southwest of Peoria, Illinois is like "Topsy" in Uncle Tom's Cabin, because it "just grew up."

How fast this enterprising company grew is indicated by the fact that it is nearing its goal of 100,000 tons of gravel for 1941—a phenomenal rise from the 32,000 tons it handled in its first season of operation, and a substantial gain from the 63,000-ton output registered last year.

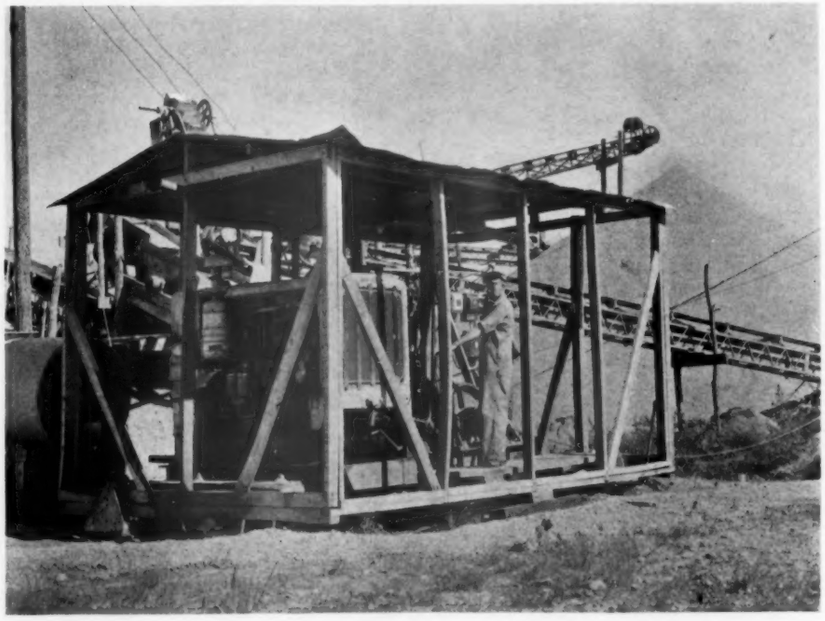
Located on Duck Island Farm near Banner, Illinois, heart of a famous duck-hunting region, the Duck Island Gravel Company is unusual in that it is not located on a railroad line, and the large tonnage handled must be transported entirely by trucks.

Oscar Linn and G. R. Barton of Canton, Illinois, the owners, claim theirs is the largest gravel deposit in the vicinity and that they are, therefore, the best employers of trucking in their community. Operating about nine months of the year, they employ an average of 14 men during these nine months. Five men are occupied during the slack season.

Gravel is recovered by means of a double-drum winch and a Sauerman 1½-cubic yard bucket, which is drawn through the pit and up an incline where the load is dumped into a hopper. The cable is anchored on solid ground across the gravel lake. The winch is powered by a Caterpillar Diesel D8800 Engine which has operated more than 3,500 hour on an average fuel consumption of about 2 gallons of 8.6-cent Diesel fuel per hour. This equipment recovers between 50 and 60 tons of gravel per hour.

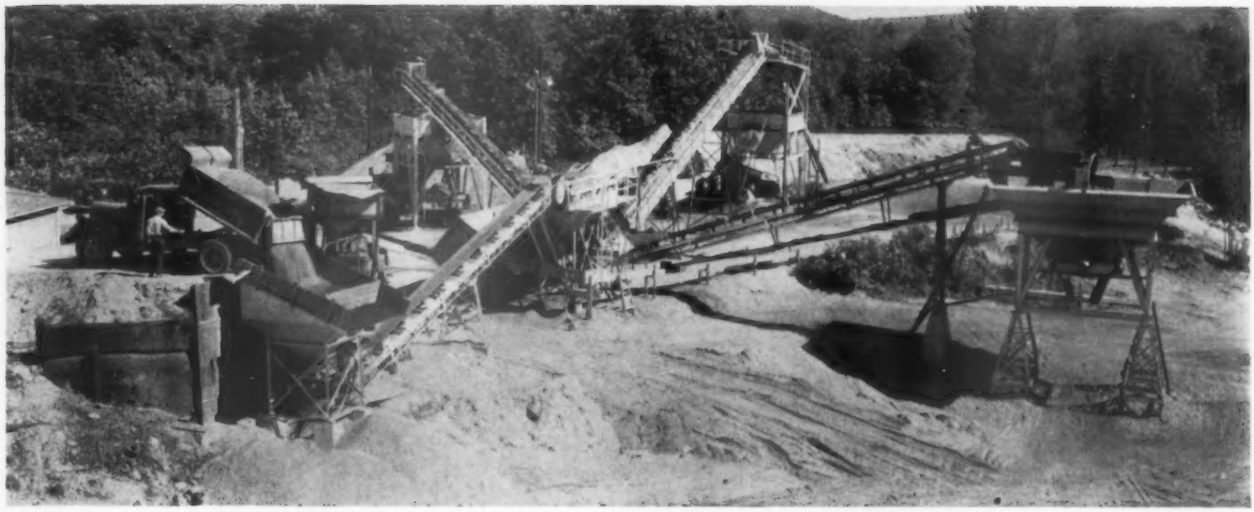
Much of the material is being used for general construction and road building, including haulage roads for strip coal mines in Fulton, Mason, McDonough and Schuyler Counties.

The partners who operate the gravel company say, "People just kept coming for gravel. We started out with old equipment and kept growing." F. G. McPheeters of Canton is plant manager.



Diesel engine driving double-drum hoist which operates the drag-scraper.

A general view of the Duck Island plant showing a part of the extensive conveyor system.



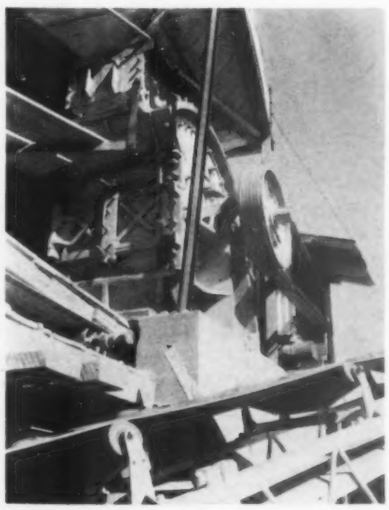
A general view of the sand-and-gravel plant as seen from the top of a stock-pile.

Connecticut Contractor-Producer Uses Smaller Plants to Supplement Output of Main Quarry

THE Edward Balf Company of Hartford, Connecticut was founded in 1878 to do contraticng work in which it is still very active. In 1905 it became an aggregate producer by building a crushed-stone plant. This plant was later discontinued in favor of the company's Number 2 plant at Newington, Connecticut, which is still its largest operation. Improvements from time to time have kept this plant efficient. Late in 1940 the Number 5 crushed-stone plant was built near the Number 2 plant in order to increase the output of small stone. At the same time a new sand-and-gravel plant was built at Framington, also a suburb of Hartford. Plant No. 2 has a capacity of 175 tons per hour and the Number 5 plant is rated at 50 tons per hour. The sand-and-gravel plant has a capacity of 80 tons per hour. In addition to these plants the company operates three ready-mixed-concrete plants and a large fleet of truck-mixers.

The deposit from which both the crushed-stone plants are supplied is New England trap rock. The quarry face averages about 100 feet in height. Small shots are made and drilling is done by an Armstrong well-drill. Three 1½-cubic yard steam shovels are used for loading. Two are old shovels, one an Bucyrus-Erie 41-B and the other a Marion Model 32. The third shovel is a Model 32 Marion which was purchased new in 1940. Six Mack trucks haul the stone a few hundred feet to the plants. Two of the shovels ordinarily load large stone for the Number 2 plant and the third loads smaller stone for plant Number 2.

The stone for plant Number 2 is discharged into a 54- by 36-inch Buchanan jaw crusher which is followed by a bucket-elevator and a 5½-foot Symons secondary cone crusher. The product of this crusher is fed by another bucket-elevator to a 6- by 10-foot Niagara 2-deck scalping screen. The oversize stone is chuted back to the cone crusher or to a Traylor 3-foot dual-reduction crusher. This is one of the first installations of this type of crusher, having been made in April, 1940. It is designed to make a cubical product. In addition to tailings any other size of stone for which there is little current demand is fed to this crusher for reduction. It reduces 2-inch stone to ⅜



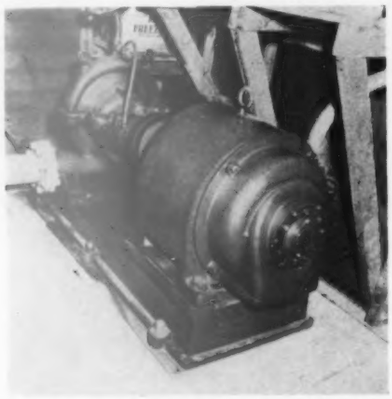
Close-up view of crusher which produces a cubical product.

One of the two stock-pile loaders.

Looking down conveyor toward screen and sand-drag.

inch minus at the rate of 60 tons per hour. Its product is carried on a belt-conveyor to the elevator feeding the scalping screen.

The intermediate-sized stone from the scalping screen is split to a pair of 6- by 8-foot Niagara screens. The two top sizes coming from these screens go into bins. The stone passing through their bottom decks, usually ⅞- or 1-inch, goes to a pair of Seco 4- by 10-



The 6-inch water pump and 50-horsepower motor which drives it.

foot 2-deck screens. The two top sizes from these screens also go into bins. The minus ½-inch stone falling through the bottom decks of the Seco screens is carried on a belt-conveyor to a 3- by 6-foot Niagara screen which makes plus and minus ¼-inch products. The total bin-storage capacity of this plant is 800 tons.

At plant Number 5 stone is discharged from the trucks over an old jaw-crusher plate into a Traylor 4-foot TY crusher. The stone is discharged from this crusher on a 30-inch by 60-foot belt-conveyor which carries it to

The 4-foot primary crusher at new Number 5 crushed-stone plant.

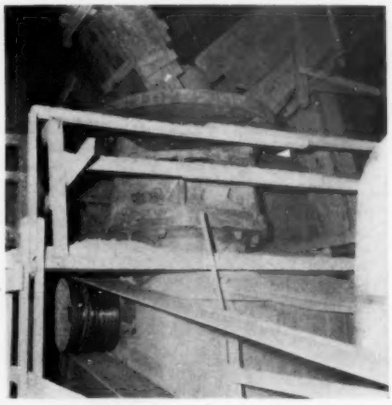
the Traylor 2-foot 4-inch reduction gyratory crusher. The product of this crusher is discharged on a 30-inch by 120-foot belt-conveyor feeding two rotary screens in series. Three sizes of stone, 1-, ¾- and ½-inch, and dust are

A general view of plants Number 5 and Number 2.

made. These drop into four 50-ton steel truck-loading bins. Except for the two crushers, all the equipment in this plant was supplied by the Iowa Manufacturing Company.

Two Haiss stock-pile loaders are used to load trucks from the extensive stock-piles. Other equipment includes a Sullivan compressor and Ingersoll-Rand drill-sharpeners and furnaces.

The sand and gravel for the Farmington plant are usually obtained near the plant from a pit which averages about 35 per cent. gravel.



The 3-foot dual reduction crusher in plant Number 2.

When a higher percentage of gravel is desired a pit about 3 miles from the plant, which contains about 45 per cent. gravel, is used. The trucks are loaded by a 1-cubic yard Marion gas-electric shovel. At the plant the material is discharged into a hopper from which a Cedar Rapids apron-feeder discharges it over a grizzly on a 24-inch by 50-foot inclined belt-conveyor. The grizzly lets the fine material fall first on the belt to act as a cushion for the larger gravel. A 3- by 12-foot Cedar Rapids Symons 2-deck screen makes plus 1-inch and 3/16- to 1-inch gravel and sand.

The plus 1-inch gravel is carried on an 18-inch by 50-foot belt-conveyor to a Niagara 4- by 6-foot 2-deck screen. This is equipped with sprays and discharges the plus 2-inch and 1- to 2-inch gravels into separate 20-ton compartments of a steel bin. The plus 2-inch gravel is hauled in trucks to a Cedar Rapids Kubit crusher near the truck hopper. This crusher produces a cubical product under 2 inches in maximum size which is fed by a short belt-conveyor back to the belt-conveyor supplying the Symons screen.

The 1- to 2-inch gravel from the

Cone secondary crusher in plant Number 2.

Symons screen is carried on an 18-inch by 80-foot inclined belt-conveyor to a 42-inch by 10-foot revolving screen with a 6-foot scrubber section. The ⅜- to 1-inch gravel from this screen is discharged into a truck-loading bin. Pea gravel can also be made by this screen if desired.

The sand from the Symons screen is discharged into a Cedar Rapids sand-drag and thence on a 16-inch by 80-foot belt-conveyor. A scraper on this conveyor can discharge the sand into a 45-ton steel truck-loading bin. Otherwise the sand is discharged on a stock-pile.

Large stock-piles of sized aggregates are built up by trucks, especially since new equipment and repair parts have become hard to get. Sand is stock-piled for 2 or 3 days before it is loaded out, in order to keep the moisture content low and consistent. A Haiss stock-pile loader is used to load delivery trucks. All the shipments are weighed on a Fairbanks truck scale.

A general view of the plant near Shippensburg.

Pennsylvania Operator Turns to Diesels for Quarry Plant Power

PAUL WALKER, a contractor who in recent years has also been a crushed-stone producer, believes in profiting from experience. In 1926 he took over the Chambersburg Stone Company with a plant near Chambersburg, Pennsylvania. This plant was built in 1923 and is operated with purchased electric power. The removal of overburden in the quarry became rather expensive and in 1940 a McLanahan & Stone log-washer was installed in the plant. Now the overburden is shot down with the rock and the log-washer removes it. This method has proved to be an economy. In 1938 the production of ready-mixed concrete was begun at this plant and four truck-mixers are now operated.

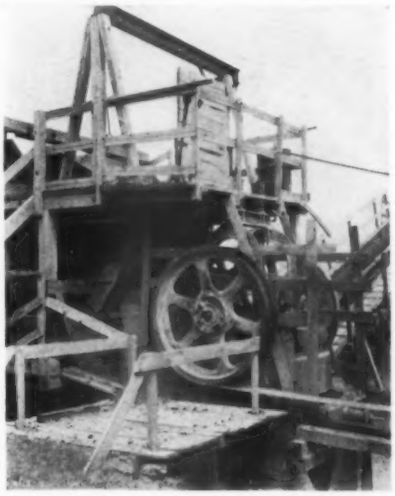
In 1933 the company took over another quarry and plant near Shippensburg, Pennsylvania, 11 miles north of Chambersburg, and operated this until 1937, when a new plant was put into operation at another location. This is operated as the Shippensburg Stone Company.

When this plant was built it was decided to use Diesel engines because of their low cost of operation. The original installation made in 1937 consisted of two new 110-horsepower Cooper-Bessemer Diesel engines and a third used Diesel engine of the same size but of another make. In 1940 the latter engine was replaced with a new 110-horsepower Cooper-Bessemer Diesel. These engines are Type G-AW-D, with 10½- by 15-inch cylinders, and operate at 327 r.p.m. They have all been operated almost continuously since they were installed and the only major expense to date was the recent installation of new piston rings in the two oldest engines. Each engine has an individual radiator and cooling fan.

The plant was built with the usual primary and secondary crushers but an intermediate crushing circuit was added when a contract was obtained to supply material for the construction of the Pennsylvania Turnpike. This increased the capacity of the plant to 150 tons per hour. Trucks discharge the quarried stone on a Telsmith pan-feeder ahead of the Farrel Bacon 36- by 24-inch primary jaw crusher. The product of this machine is carried on a belt-conveyor to a revolving screen. The oversize from this screen goes to the intermediate Kennedy-Van Saun No. 6 gyratory crusher and the product of this machine is elevated to a second revolving screen. The oversize from this screen goes to the 6-inch Allis-Chalmers gyratory crusher which originally was the secondary crusher. The product of

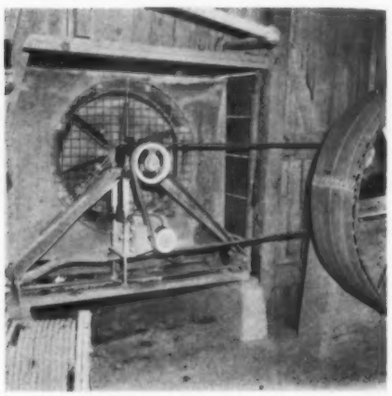
(Continued on page 61)

Final-reduction gyratory crusher and elevator.



Primary crushing is accomplished by this 36- by 24-inch jaw crusher.

The original two Diesel engines, one of which drives the secondary crusher and a generator, the other a compressor and a generator.



Cooling radiator and fan for the new Diesel engine.

Kelley Island Installs Direct-Firing Coal Mills in Lime Plant at Buffalo

General plant view with the two new 100-foot steel stacks shown.

THE recent installation by the Kelley Island Lime & Transport Company of direct-firing coal mills on the two rotary kilns of its lime plant at Buffalo, New York has given gratifying results in fuel savings, increased capacity, and in other ways. Interesting also are the problems which these improvements have created in related departments. A brief description of important developments connected with this phase of the operations follows.

The plant was built in 1916 with the primary purpose of enabling the company to supply lime more economically to the eastern market. Conditions have changed considerably through the years and now most of the output is bulk quicklime for steel mills and chemical plants in Buffalo, Niagara Falls, Rochester, etc. The original plant was a 1-kiln operation and had a hydrating department. A gas producer was used to fire this kiln and, when in 1922 a second kiln was installed, another gas producer was added. In 1935 the steam turbines used with the producers were replaced by a system drawing off CO_2 from the kiln dust chambers. In April, 1941 a Raymond direct-firing coal mill was installed on kiln Number 1 and the mill on kiln Number 2 went into operation on September 8, 1941.

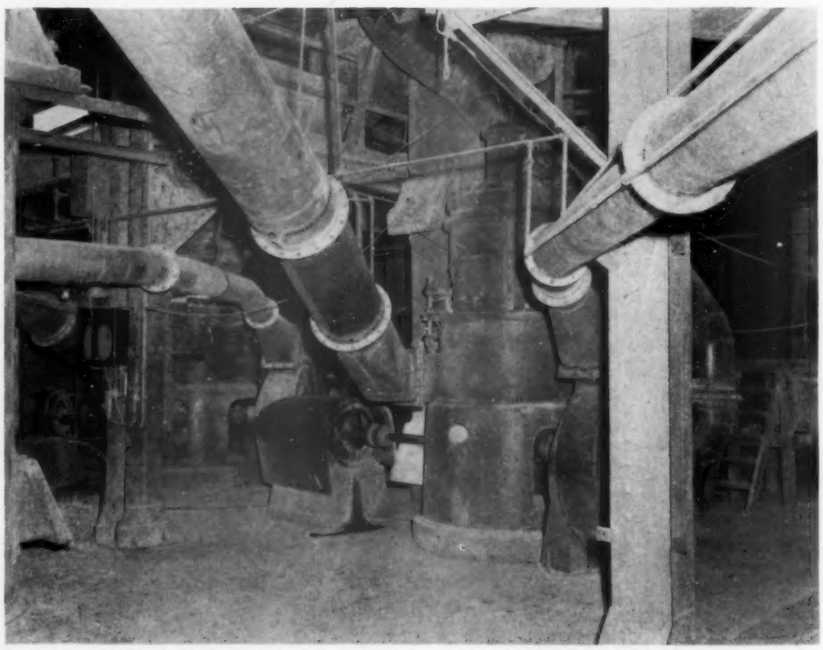
The limestone calcined in this plant is a ½- to 1¼-inch product from the company's quarry and plant at Rockport, Michigan, on Lake Huron. Self-unloading boats unload the stone to dock storage with a capacity of about 60,000 tons. A few other sizes of stone are also stored to meet commercial demands. At present a locomotive crane rehandles the stock-piled stone to hoppers from which a conveyor system rehandles it to the kiln-feed bins. This system has some difficulty in keeping up with the increased capacity of the plant and is to be replaced by a reclaiming tunnel-conveyor system which will have a capacity of about 225 tons per hour. The new system will make unnecessary the present cold-weather practice of heating the aggregates in the stock-piles and hoppers by means of steam pipe-lines.

One of the two 8- by 135-foot Power & Mining rotary kilns is equipped with a Hardinge constant-weight feeder and the other has a reciprocating feeder.

When gas producers were used, many delays were experienced due to the clinkering of certain types of fuels and the necessity for periodical cleaning of the gas pipes. The kilns had to be shut down twice a week for these cleanings which took from 4 to 10 hours. Under these conditions the capacity of each kiln averaged about 72 tons in 24 hours and the coal consumption was 1¼ tons per hour per kiln or over 0.4 ton per ton of lime produced.

Now with the coal mills installed it is seldom necessary to shut down the kilns. The capacity of each kiln is from 100 to 105 tons in 24 hours and only ⅓ ton of coal is used per ton of lime produced. Seal rings are to be installed on the kilns and this is expected to improve results further.

The slack coal now being used costs 40 cents per ton less than the nut coal formerly required for the producers. With the coal mills the moisture content of the coal makes little difference but the sulphur content is impor-



The two direct-firing coal mills which fuel both 8- by 135-foot rotary kilns.

tant. Each mill is connected to a Brown recording pyrometer which automatically controls the coal-drying temperature.

Considerable ingenuity was required to replace the gas producers with the coal mills without serious interference to kiln operation. The mill now connected to the Number 2 kiln was first installed in a temporary location connected to the Number 1 kiln. The Number 1 gas producer was then taken out and the second coal mill installed in its permanent location connected to the Number 1 kiln. The original mill, still in its temporary location, was then connected to the Number 2 kiln and the second gas producer was taken out. This winter, if it is possible to shut the Number 2 kiln down long enough, this mill will be installed in its permanent location. The coal is unloaded from cars to a hopper and an elevator feeds it to the same bins used for the gas producers.

Dust chamber, damper, and stack base at one of the kilns.

Each time a kiln was stopped to connect up the coal mills it was also connected up to new kiln stacks. These are 6- by 100-foot self-supporting steel stacks lined with brick for about half their height. Natural draft is used and each kiln is equipped with a Thwing recording pyrometer. Allis-Chalmers seal rings are to be installed and dampers ahead of the stacks will be operated automatically by a Hagan combustion gage and control system. These improvements are expected further to increase kiln capacity and fuel economy and the system will also operate with less attention.

View showing the beater mills.

Direct-firing coal mill on kiln Number 1.

The lime from the Number 2 kiln is discharged through a grizzly to a drag-chain conveyor. That from the Number 1 kiln drops through a grizzly to a chain-bucket elevator which also receives the lime from the conveyor. The elevator discharges the lime into a 5- by 60-foot rotary cooler which is divided into quadrants for most of its length. Before the coal mills were installed this cooler brought the lime temperature down to about 400 degrees F. when both kilns were running, or about 200 degrees with one kiln in operation. The increased kiln capacity due to the coal mills has thrown an added load on the cooler, and the higher temperature of the lime leaving it has created handling problems. Steps are now being taken to improve this condition.

The cooled lime is fed by a chain-bucket elevator to a belt-conveyor with heat-resisting belting and a magnetic head pulley. The improvement of cooling conditions will greatly increase the life of this belt. The lime is discharged into three bins of 150 tons capacity each. From these bins box or hopper cars or l.c.l. containers can be loaded direct. Bags and drums can be loaded through a spout under one of these silos. A series of screw-conveyors and elevators also feeds lump lime to a Schaffer continuous hydrator from another of these silos.

The hydrated lime is stored in a special bin system to allow curing for several days before further processing or shipment. Further processing is done by two Raymond cyclones and beater mills and the system is connected to two Raymond cloth-bag dust-collectors. Quicklime is ground by a Kent Maxecon mill operating in closed circuit with an air-separator. A 4-tube bag-packer is used for hydrated lime and a 2-tube packer for quicklime.

Shippensburg (from page 59)

this crusher is elevated to a vibrating screen from which the oversize is returned to the crusher. Each of the three screens produces one or more finished sizes of crushed stone which drop into truck-loading bins.

One of the two original Cooper-Bessemer Diesel engines drives, through Goodyear V-belts, a generator which supplies current for the motors operating the plant equipment. A Chicago Pneumatic 12- by 10-inch air-compressor is also driven through a Wood clutch and flat belt.

The other engine drives a Westinghouse 75-kv.-a. generator through V-belts and the 6-inch Allis-Chalmers crusher, also through a Wood clutch.

The newest engine drives the primary crusher through a Wood clutch and flat belt. The electric-motor equipment is listed in the table below.

MACHINE	MOTOR
6-inch Kennedy-Van Saun crusher	50-horsepower General Electric
Telsmith pan-feeder	7½-horsepower General Electric
Belt-conveyor	15-horsepower General Electric
First revolving screen	25-horsepower General Electric
First bucket-elevator	15-horsepower
Second revolving screen	10 horsepower Westinghouse
Second bucket-elevator	10-horsepower Allis-Chalmers
Vibrating screen	3-horsepower General Electric
Engine-water pump	5-horsepower

Sand-and-Gravel Directors Hear of Priority Preference Ratings

PREFERENCE ratings for the sand-and-gravel industry captured the interest of those who attended the mid-year meeting of the National Sand & Gravel Association board of directors at Washington, September 25 and 26. Those present had the advantage of the discussions of Dr. E. E. Pratt, Dean C. Gallagher and R. B. Puckett, all connected with the Division of Priorities of the OPM in Washington.

Dr. Pratt explained that the country's defense requirements embrace three types of uses: (1) the Army and Navy, (2) lend-lease needs, and (3) other essential uses. The granting of priority preference ratings is based on the uses to which the materials affected are to be put, rather than on the materials themselves. He pointed out that the PD-3 form can not be used to buy capital goods, except in a few cases, such as special tools or machines. He said that by October 15 there would be 40 district offices ready to give information on priorities to those interested.

Mr. Puckett described some of the uses of some of the rating forms.

Mr. Gallagher, who represented the Repair Division of OPM, said that the sand-and-gravel industry had been placed on the P-22 list for repair parts, thus receiving an A-10 rating and being classed as an industry essential to national defense. By a decision of Dr. Wilbur A. Nelson of the Division of Priorities the industry's producing units are considered mines and are thus entitled to use the P-56 form, which raises the industry's priority status from A-10 to A-8.

To enable a concern to use the P-56 form in ordering repairs it will be necessary for it to be certified by OPM as a mine and to receive a serial number. These serial numbers are now being assigned by OPM, the 1941 edition of PIT AND QUARRY DIRECTORY serving as the authoritative guide in determining what companies are to be given the "mine" status.

Until such serial numbers have been assigned (and an A-8 rating thereby granted) the P-22 preference-rating order may be used and A-10 may be endorsed on all orders for repairs where there is an apparent need for its use in order to get delivery. Every member of an industry given an A-10 rating is entitled to use the P-22 order without proving that he is actually working on defense jobs or contracts. If the A-10 endorsement does not get the desired results the PD-1 form should be used.

Speaking on this subject, Executive Secretary Ahearn said that a producer desiring to purchase new equipment should use the PD-1 form (obtainable from any field office of OPM) and accompany it by a letter, addressed to the Division of Priorities, OPM, Washington, listing the defense projects to which he is shipping and giving complete information about the projects.

For the purchase of new equipment and repairs included on the critical list he can use the PD-3 form, which is issued in the field by Army and Navy officers. On some occasions these forms have been issued to sand-and-gravel producers. Mr. Ahearn advised making the acquaintance of local Army and Navy officers.

A plant working on a defense job or contract may get the same rating as that given the job, if the job is one with "extendibility". Thus, in the case of the Ford bomber plant at Ypsilanti, Michigan, the A-1-a rating given this project was extended to the American Aggregate Corporation's plant furnishing the aggregate because of the extremely important nature of the job.

Mr. Ahearn explained that the serial numbers certifying operations as mines are issued by the Emergency Mine Coördinator in each state and that as soon as they are given out those receiving them are given an A-8 rating. He also pointed out that a producer shipping material to a bomber plant, for a strategic highway and the like may be able to get telegraphic granting of an A-1-a rating. The crushed-stone industry, he added, is of course, in the same category as the sand-and-gravel industry, both being considered mining industries.

W. J. McGarry, Association of American Railroads, said that there is no present shortage of open-top cars, and that none is expected even by the end of the year, in spite of the unusually high carloading records of recent months.

Stanton Walker, the association's engineering director, reported on engineering and research activities; the proposed new Federal specifications for concrete aggregates, railroad ballast and sewage filtration; the status of chert gravel in various localities; new laboratory equipment, etc.

Harry Kirk, Associated General Contractors of America, estimated that private new-plant construction in view would amount to about $1,000,000,000, defense housing possibly $2,000,000,000, the building of 240 cantonments $480,000,000.

Fred F. Bartel, the association's research fellow at the University of Maryland, gave a stereopticon illustrated report on the studies of the characteristics of coarse aggregates in relation to the durability of concrete being carried on there.

The members and guests visited the university laboratory and inspected the facilities and work of the National Sand & Gravel Association's Research Foundation.

The following association officers, members and guests attended the board meeting:

V. P. Ahearn, *executive secretary* (National Sand & Gravel Assn., Washington, D. C.).

H. N. Battjes (Grand Rapids Gravel Co., Grand Rapids, Mich.).

J. Fennell Berger (John A. Roebling's Sons Co., Trenton, N.J.).

Paul P. Bird, *president* (Boston Sand & Gravel Co., Boston, Mass.).

Robert Bornscheuer (J. K. Davison & Bro., Pittsburgh, Pa.).

H. D. Caldwell (Ohio River Sand Co., Louisville, Ky.).

Claude L. Clark (Ohio Sand & Gravel Assn., Columbus, O.).

Otto S. Conrades, *vice-president* (St. Louis Material & Supply Co., St. Louis, Mo.).

Anderson Dana (Seaboard Sand & Gravel Co., New York, N. Y.).

Alex. W. Dann (Dravo Corp., Keystone Sand Division, Pittsburgh, Pa.).

H. S. Davison, *secretary-treasurer* (J. K. Davison & Bro., Pittsburgh, Pa.).

Alexander Foster, Jr. (Warner Co., Philadelphia, Pa.).

Floyd C. Fuller (Portsmouth Sand & Gravel Co., Portsmouth, O.).

E. J. Goes (Koehring Co., Milwaukee, Wis.).

B. V. Hedrick (B. V. Hedrick Gravel & Sand Co., Lilesville, N. C.).

J. Rutledge Hill (Gifford-Hill & Co., Dallas, Tex.).

Wm. Edward Hole (American Aggregates Corp., Greenville, O.).

Daniel J. Miller (Portland Sand & Gravel Co., Portland, Pa.).

Robert Mitchell (Consolidated Rock Products Co., Los Angeles, Cal.).

H. V. Owens (Eastern Rock Products, Inc., Utica, N. Y.).

Stanley A. Phillips (PIT AND QUARRY, Chicago, Ill.).

J. P. Eyre Price (Wyoming Sand & Stone Co., Scranton, Pa.).

John Prince (Stewart Sand & Material Co., Kansas City, Mo.).

Nathan C. Rockwood (*Rock Products*, Chicago, Ill.).

Bruce G. Shotton (Hendrick Manufacturing Co., Pittsburgh, Pa.).

H. N. Snyder (Buffalo Slag Co., Buffalo, N. Y.).

F. P. Spratlen, Jr. (Spratlen-Brannan, Inc., Denver, Colo.).

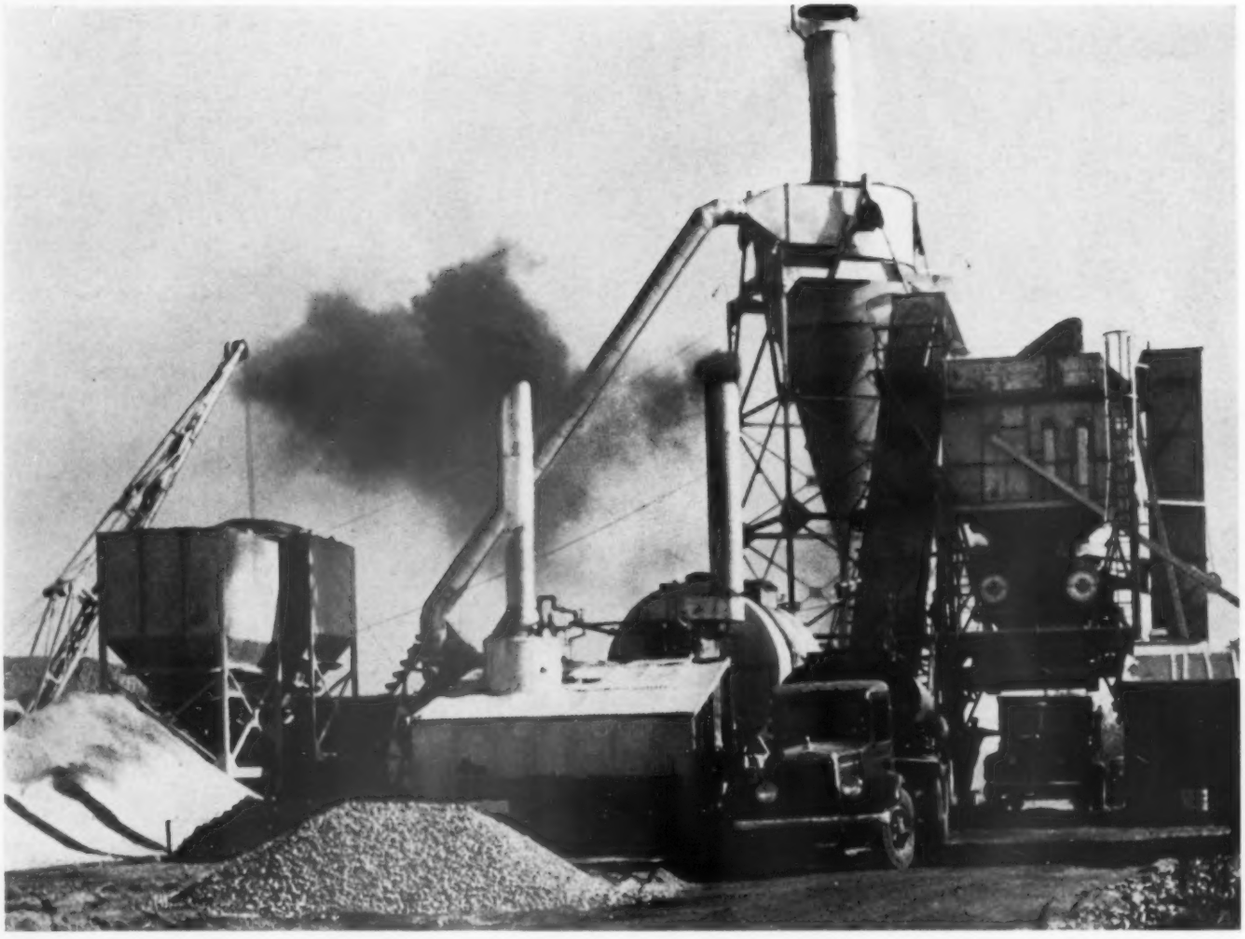
Stephen Stepanian (Arrow Sand & Gravel Co., Columbus, O.).

E. Guy Sutton (Neal Gravel Co., Mattoon, Ill.).

Ray V. Warren (Western Pennsylvania Sand & Gravel Assn., Pittsburgh, Pa.).

W. H. Wyckoff (Merom Gravel Co., Decatur, Ill.).

Stanton Walker, *director of engineering* (National Sand & Gravel Assn., Washington, D. C.



This plant is almost identical to the one at Quonset Point described here. Naval regulations prohibit the taking of photographs at the Quonset Point base.

Supplies 250,000 Tons of Asphaltic Concrete for Naval Air Base Over Nine-Month Period

THE construction of the various army and navy bases, camps, airports, etc., on the defense program has all been emergency work with speed a major consideration. As a result many records have been set for the various types of construction involved and many of the projects have been completed far ahead of even the most optimistic schedules. It is doubtful, however, if many of these records can compare with that made by the Warren Brothers Roads Company at the Naval Air Base at Quonset Point, Rhode Island. This is said to be the largest asphalt-concrete paving project ever undertaken in this country, consisting of 735,000 square yards of airport runways and 190,725 square yards of roadways. This work required 267,349 tons of bituminous mixture. All this was produced by a new Warren mobile Type 900 asphalt plate rated at 100 tons per hour. Actually this plant has produced as much as 150 tons of mixture per hour and the best day's output was 3,000 tons in 20 hours. It went into operation on January 13, 1941, 16 days after the contract was awarded, and the job was completed on September 6, 1941. The production of 267,349 tons of hot asphaltic-concrete mixture in slightly less than an 8-month period required long working hours and a seven-day-per-week operation. The average output per operating hour for this period was 111 tons and the average per hour of elapsed time was 87 tons. It is evident that few plant delays were experienced in making such a record and what makes it even more remarkable is the fact that some unusually cold weather, with much ice and snow, was experienced early in the year.

The contractors for the construction of this air base are the George A. Fuller Company and Merritt-Chapman & Scott Corporation. What had been a summer cottage colony was filled in and extended with a hydraulic fill. This work was begun in July, 1940 and dedication ceremonies were held on July 12, 1941, which is a remarkable record.

The airport runways have an asphaltic-concrete base course with a minimum thickness of 3 inches and a 1½-inch top course. In spite of the fact that some of the pavement was laid on a frozen subgrade and much of it under severe winter-weather conditions, there has been no appreciable settling of the pavement and no patching has yet been necessary. As soon as the asphaltic foundation of a portion of the one-mile-long runway was in place it immediately took the heavy truck traffic of a large grading operation and

(Continued on page 65)

By W. E. TRAUFFER

LEFT—Dredge equipped with 6-inch pump which supplies the sand-and-gravel plant.

Same Deposit Yields Industrial Sand and Top-Grade Aggregates

ONE of the most interesting of the small sand-and-gravel operations encountered by the writer in his recent travels are those of the Natural Sand & Gravel Company, Inc., near Millville, New Jersey, in the heart of an important industrial-sand-producing section. Two entirely separate small plants are operated, one for the production of industrial sands and the other for that of commercial sand and gravel. These materials are being produced from the same deposit with separate dredges.

This company is owned by the firm of Fox & Hill, highway contractors, who purchased it in September, 1939 from the original owners. The original small wooden plant built in 1938 was replaced in June, 1940 by the two present plants which are built entirely of steel. The delivery trucks, cranes and other equipment of this type are used jointly.

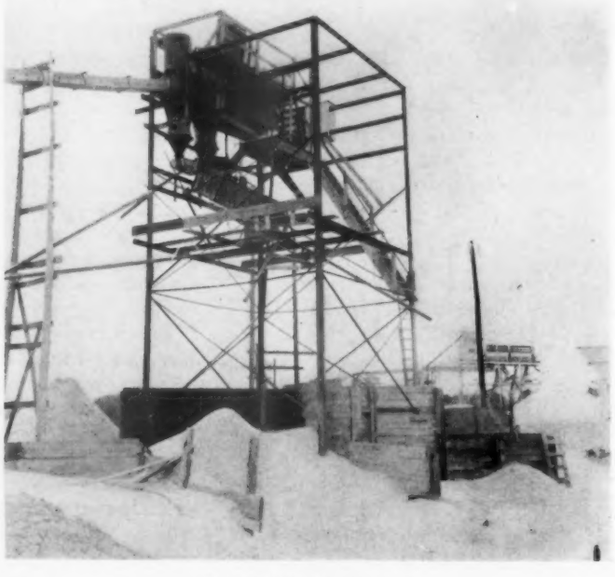
The deposit 3 miles east of Millville consists of 258 acres and is typical of the deposits found in this section. It averages from 25 to 30 per cent. gravel over ¼ inch in size and contains only a small amount of plus 1¼-inch gravel. The deposit is coarsest near the bottom, where a bed of clay is encountered at a depth of 30 feet. Below the clay is fine sand but as yet no attempt has been made to excavate this. The sand in this deposit averages 98.37 per cent. silica, 0.30 per cent. iron oxide, 0.64 per cent. aluminum oxide, and small amounts of zinc and magnesium oxides. The overburden has a maximum depth of 4 feet and is removed with the underbrush and the scrub-oak trees native to this section.

The dredge now supplying the industrial-sand plant is the one used with the original plant. It has a 4-inch Millville centrifugal dredge pump which is driven by a 67-horsepower Allis-Chalmers gasoline engine. Dredging is carried to a depth of only 10 to 12 feet in order to obtain only the finest of the sand.

The dredge pipe-line terminates at the plant at a breaker box from which the material is discharged over a 2-deck stationary screen with ½-inch and Number 7 openings. All the material passing over both decks is wasted. The fine sand passing through the bottom deck flows to a 24-inch Link-Belt Shaw classifier. The overflow goes to a second 24-inch Shaw classifier which makes minus- 50-mesh sand for foundries, for slate polishing, coal cleaning, etc. This classifier can be adjusted to make even finer sizes if desired.

The product of the first classifier is discharged on a 2-deck vibrating screen which is usually equipped with 8- and 16-mesh wire cloth. When thus equipped the screen makes dustless screenings off the top deck, Number 3 filter sand off the bottom deck, and plaster sand through the bottom deck. As this screen is at present overloaded a second screen is to be installed and

Plant which makes gravel and coarse sand.

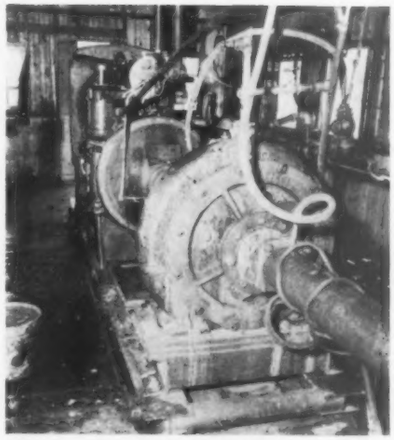


The industrial-sand plant.

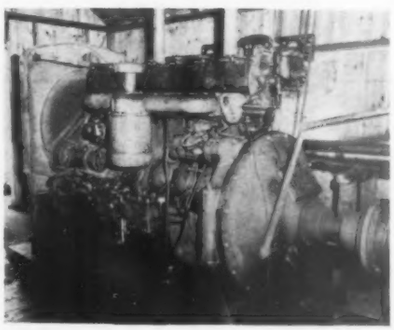
the load will then be split between them.

The dredge which supplies the building sand-and-gravel plant was built at the same time. It has a plain nozzle and digs to the full depth of the deposit, following the other dredge which has taken only the surface fines. The Taylor-Wharton 6-inch manganese-steel dredge pump which was installed a few months ago is one of the first to be made by this company under its own name. It is driven by a direct-connected 165-horsepower Murphy Diesel engine. The water pump and the hoist which operates the nozzle and shore lines are also driven from this engine.

A 4-inch pump serving the industrial-sand plant.



The 6-inch pump and 165-horsepower Diesel engine on the dredge.



Another view of the Diesel engine.

The 6-inch dredge pipe-line terminates at a breaker box on the top of the plant from which the material is discharged over a 2-deck stationary screen with 5/16- and 3/16-inch openings. The top deck serves only to absorb the impact and all the plus 3/16-inch gravel is discharged into a 7- by 20-foot Millville trunnion-type revolving screen. This is usually fitted with 5/16-, 7/16-, ⅜-, and 1¼-inch openings on its four 5-foot-long main-barrel sections. Inside the first section is a 5-foot long inner jacket with ⅜-inch openings which takes the wear from the discharge to the screen. This section also has a 3/16-inch outer sand jacket. Under the section and at the end of the screen are receiving boxes with chutes to separate piles for the four sizes of gravel and the oversize produced. By means of these chutes any two or more of these sizes can be blended into the piles.

The minus 3/16-inch sand passing through the sand jacket of this screen and the bottom deck of the stationary screen goes to a flume from which it is split to a pair of 7-foot Allen cone classifiers. These make concrete sand and the overflow is flumed to waste.

A Thew-Lorain 30 gasoline crawler crane with a ½-cubic yard clam-shell bucket does all the rehandling and loading of stock-piled materials for both plants. All shipments are made by trucks and these are weighed on a Bennington truck scale at the plant office. There is also a new 105-ton 3-compartment Blaw-Knox bin with a weighing batcher which is used to weigh out concrete mix into trucks. The entire yard area has a gravelled surface which makes all-year operations possible. Wash water is supplied from Menantico Creek by a 2-inch Frederick pump for each plant.

Air Base *(from page 63)*

from that time on all convenient truck hauls were routed over these runways. Although the runways were only partially completed they withstood a greater load than they will ever be called on to take in the future normal operation of the airport.

Results were so satisfactory that asphaltic concrete was used on this project in many places not originally contemplated. These include car-door-level railroad loading platforms, railroad team-track areas, material-storage yards, warehouse floors, packing areas, sidewalks, etc.

The 1.3 mile access road from U. S. Highway Number 1 was to have been built of reinforced concrete but as it ran through a peat bog with poor drainage it was obvious that settlement would take place. A gravel surface was first laid but this failed to stand up. As a temporary expedient a 3-inch depth of asphaltic base mixture was laid. This stood up under the extremely heavy traffic construction and has since been used as the foundation for a permanent wearing surface.

The crushed gravel and part of the sand used in this work were obtained from a plant erected close to the site by the Boston Sand & Gravel Company. The gravel was ¼ to 1¼ inch in size and the sand was of usual concrete grading. To these materials was added a carefully proportioned quantity of very fine sand also obtained locally and an A-1 mixture was obtained without the use of filler dust. These materials were hauled in trucks to the asphalt plant where they were discharged on stock-piles. An Allis-Chalmers tractor equipped with a bulldozer pushed the stock-piled material within reach of a Model 405 P&H gasoline crawler crane with a 1-cubic yard clam-shell bucket.

The gravel was stored in a 40-ton bin compartment and the two grades of sand were blended by the crane into a second 40-ton compartment. Jeffrey vibrating feeders discharged these materials in the desired proportions to a bucket-elevator feeding the 72-inch by 24-foot oil-fired rotary drier. A Houck burner was used. The dried aggregates were elevated to a Robins 3-deck Elliptex screen from which they were discharged into the four compartments of the plant bin. The products were: sand, ½-inch gravel, ¾-inch gravel and 1¼-inch gravel. The drier was connected to a 12-foot-diameter cyclone from which the dust was discharged to the hot elevator. A Sturtevant exhauster fan was used.

The aggregates were weighed in a 5,000-pound batcher with a Howe dial scale from which they were discharged into a 5,000-pound mixer. The bitumen, which was unloaded from trucks into two 10,000-gallon tanks, was weighed in a bucket with multiple discharge valves. This also had a Howe dial scale. After one minute in the mixer the product was discharged into trucks. Mack, Jr. trucks were used, each hauling 4 batches or 10 tons per load. The placing was done by two Barber-Greene bituminous finishers. Power was furnished by two Caterpillar D-13000 Diesel Engines and one Caterpillar 46-30 Diesel-generator set.

THE Myers Sand & Gravel Company of Anderson, Indiana, is removing the last of its machinery and equipment from its old plant to its new modern equipped plant on Alexandria Road, north of the city.

A part of the old tract is being laid out in building lots and a new street opened through the tract.

Insoluble Residue in Cement and Its Effect on the Strength of Concrete

WITH respect to cements generally, it is hoped that the results of the initial test made upon any one of them will yield a key or indication as to that cement's quality or behavior at a later date.

Portland cement, for example, and in the extensive advertising connected with it, is recommended for concrete. In the same breath concrete is recommended for permanence. Just what permanence means has never been definitely stated, and, in connection with concrete, it may be of a temporary nature, a period of years, or a century. Concrete that has withstood the most severe conditions for a period of years is pointed to with a great deal of pride. Concrete that has failed to stand up under normal conditions is very seldom referred to by the producers of cement but quite often discussed by the consumers of it.

In all specifications having to do with cements the results of laboratory tests up to the 7-day period determine whether or not the cement is satisfactory. Most cements are accepted or rejected immediately the 7-day strength tests are available and provided other specifications have been met. In isolated cases the strength of the cement at 28 days decides whether or not it has passed the general specifications, but in the majority of cases involving the use of cement the results of the 7-day strength test determine whether or not it will be used in a given construction. Thus, considerable quantities of cement that has been accepted on the 7-day test and has found its way into innumerable concrete constructions is in use, and, having set and hardened over a period of several weeks, can not very well be rejected even though the 28-day test covering strength may have shown the cement not to have passed the specification.

This, incidently, does not suggest that even the passing of the 28-day strength requirement for cement results in a true indication of that cement's behavior in concrete over a period of years.

This also refers to other cement specification requirements, which a cement must meet to be acceptable for use. As matters have stood for years, a pat made from neat cement upon emerging from the steam test in a firm and hard condition is considered as being sound. The fact that the concrete made up with this cement may expand and disintegrate over a period of years suggests that the steam test does not indicate the general soundness of the product.

During the past few years there has been considerable agitation for a more correct test for determining the soundness of cement and, as a result, much has been heard of the autoclave test as being a better indication of a cement's performance in concrete over a period of years after having been put in use. The fact that cements successfully passing the autoclave test and showing expansions under 1 per cent. have been found to behave badly in concrete over a period of years, again suggests that initial tests do little to determine the quality of a cement, if field indications at later ages are to be taken into consideration.

In all the specifications covering cements, and with those covering Portland cements in particular, it would appear that less attention is paid to the insoluble-residue specification than to any of the other governing factors having to do with the acceptance or rejection of a cement. The fact that a specification, covering the amount of insoluble residue that may be present in Portland cement, exists at all is due not to anything significant it may have learned concerning the quality of the cement, but to a desire to know whether the cement may be adulterated. Ordinarily the presence of several per cent of insoluble residue in a cement that is sound in the steam and autoclave tests suggests that sand or some other material high in insoluble content has been ground in with the cement and, being thus adulterated, the cement does not fall within the specification definition covering Portland cements.

Having done a considerable amount of experimental work in connection with special cements, in which the insoluble residue contents are initially very high, tests made over a period of years showed that this insoluble content gradually goes into solution and diminishes in quantity. With the expectation that the small amounts of insoluble residue present in the normal Portland cements were also taken into solution and gradually disappeared, a number of tests were made upon various brands of Portland cements in connection with the tests already started upon special cements (sometimes called pozzuolan, high-silica, or blended) and masonry cements. In these tests five brands of Portland cement produced in Mexico, and the Atoyac type of special cement and the Plastocement type of masonry cement were included.

By ALTON J. BLANK
Executive Vice-President
Cementos Atoyac, S. A.

The Plastocement masonry product, composed of a mixture of caustic lime in the amount of 75 per cent. with a siliceous sand in the amount of 25 per cent., was hydrated and ground under moist-heat conditions without the addition of any cement. The products had normal setting times, low initial strengths with progressive gains shown over a period of years. Insoluble-residue tests were made upon the mixture of lime and siliceous material: (1) prior to hydration; (2) immediately following the hydration step of the process and prior to the moist-heat grinding step; (3) on the product as issued from the tube-mill after the moist-heat grinding step; (4) upon neat test cylinders 6 inches by 12 inches that had been stored under water for two years; (5) upon cylinders after three years storage under water; and (6) upon cylinders stored under water for four years. The results of these tests are shown in Table I.

TABLE I

Sample No.	Insoluble-Residue Contents					
	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6
1	26.20	24.40	19.20	11.50	9.70	7.20
2	26.00	23.00	19.90	15.00	12.20	9.40
3	25.40	22.60	18.40	12.80	10.10	8.10
4	22.30	21.00	16.20	10.40	8.00	6.60

The gradual diminishing amount of insoluble matter present in the reacted lime-siliceous product over a period of years shows that the insoluble silica, alumina, etc. react and go into solution with the lime, forming compounds of a desirable nature that contribute to, or are responsible for, the progressive increase in strength of the products, and it is to be expected that these reactions will continue until all the insoluble matter has been absorbed or taken into solution. The total percentage of the initial insoluble matter present in the lime-siliceous mixture, which has gone into solution over the four year period, is shown in Table II.

TABLE II

Sample No.	Percentage Insoluble Matter Going Into Solution				
	Test 2	Test 3	Test 4	Test 5	Test 6
1	7%	27%	60%	63%	73%
2	12%	24%	43%	53%	64%
3	12%	28%	50%	60%	69%
4	6%	28%	54%	65%	70%
Averages	9%	27%	52%	60%	69%

A second series of tests involving the use of the Atoyac special cement, composed of a mixture of about 25 per cent. caustic lime hydrated in the presence of about 75 per cent. siliceous material, and the moist reacted mixture ground with about 65 per cent. Portland-cement clinker under moist-heat conditions in the tube-mill, were undertaken. The insoluble-residue contents of: (1) five samples of the product freshly discharged from the mill; (2) neat 6-inch by 12-inch cylinders stored under water for 1 year; (3) neat cylinders stored under water 2 years; and (4) cylinders stored under water for 3 years are shown in Table III.

TABLE III

Sample No.	Insoluble Residue Content Atoyac Cement			
	Test 1	Test 2	Test 3	Test 4
1	15.50%	6.00%	5.10%	3.90%
2	12.00%	8.20%	7.60%	6.30%
3	13.50%	9.00%	7.80%	5.40%
4	13.50%	9.20%	7.10%	5.00%
5	15.00%	9.50%	8.00%	6.40%

As in the case of the lime-siliceous mixture, the insoluble matter in the lime-siliceous-Portland cement product decreased with time, Table IV.

TABLE IV

Sample No.	Percentage Insoluble Matter Going Into Solution		
	Test 2	Test 3	Test 4
1	62%	68%	75%
2	32%	37%	52%
3	34%	43%	60%
4	33%	48%	63%
5	37%	47%	56%
Averages	39%	48%	61%

Of the five samples of Portland cement tested, four were purchased in the open market and were probably several weeks old from the time of grinding, a fifth sample was taken direct from the mills. In Table V are shown: (1) the insoluble-residue contents of the cement; (2) the insoluble-residue content of 6-inch by 12-inch neat-cement cylinders stored under water for 1 year; (3) cylinders stored under water 2 years; (4) cylinders stored under water 3 years; and (5) cylinders stored under water 4 years.

TABLE V

Sample No.	Insoluble-Residue Contents of Portland Cements				
	Test 1	Test 2	Test 3	Test 4	Test 5
1	0.22%	0.38%	0.64%	0.90%	1.12%
2	0.30%	0.46%	0.68%	1.10%	1.44%
3	0.44%	0.72%	1.26%	1.80%	2.28%
4	0.36%	0.68%	0.96%	1.32%	1.84%
5	0.28%	0.44%	0.78%	1.18%	1.50%

The percentage of insoluble matter increases in each of the Portland cement brands up to the 4-year period are shown in Table VI.

TABLE VI

Sample No.	Percentage Insoluble Matter Going Out of Solution			
	Test 2	Test 3	Test 4	Test 5
1	72%	190%	309%	409%
2	53%	126%	266%	380%
3	63%	186%	309%	418%
4	88%	166%	266%	411%
5	57%	178%	321%	435%
Averages	62%	169%	294%	410%

It is interesting to note that the Plastocement type of masonry cement, composed of lime with siliceous material and to which no Portland-cement clinker has been ground in, has an average of 69 per cent. of its initial insoluble matter as present in the fresh sample go into solution in the neat test pieces stored under water over a period of four years. This product, incidently, shows a progressive increase in strength.

The special Atoyac type of cement, composed of lime-siliceous mixture to which Portland-cement clinker has been ground in, has an average of 61 per cent. of its total initial insoluble matter taken into solution when neat test pieces are stored under water over a period of three years. This product also shows a progressive increase in strength.

The five different brands of Portland cements, on the contrary, show marked increases in insoluble matter with age, and the average of the five brands shows that the insoluble-residue content in neat test pieces stored under water for four years increased by 410 per cent. over the initial content noted.

These cements, while showing a moderate increase in strength up to the age of 3 months, thereafter show practically no increase in strength to the 9-month age, and thereafter show retrogression in strength.

The writer attempts no explanation of the cause and effect of the conditions found and the results obtained from the testing of Portland and special cements, since too many factors are involved. However, it would appear, in the case of Portland cements as a whole, that somewhere there exists a faulty design which, if corrected, might go a long way toward solving some of the weaknesses and defects found in Portland-cement concrete and over a period of time, that are not indicated in the accelerated laboratory tests made on that product.

Advice on Handling Multiwall Paper Bags

Of probable interest to cement, lime and other manufacturers are the following comments by A. G. Clarke of Bagpak, Inc., on the handling and loading of multiwall paper bags.

"The successful use of multiwall paper bags as shipping containers depends upon correct design and handling. The design factor covers the correct size, proportion, and strength for the commodity in question; the strength factor, of course, must meet the Official Rate Classification requirements. A bag can meet these conditions and still fail unless it is properly handled and properly loaded in the cars at the time of shipment.

"The principles of successful handling and loading require attention to the following points:

"1. Regular inspection of all equipment used in handling the filled bags. By this is meant conveyors, chutes, hand-trucks, etc. This inspection is to make certain there are no nails, bolts, splinters, or other sharp corners that can puncture or tear the bags.

"2. When ordering equipment from the railroads notify them that the cars are for paper loading and good bottoms are essential.

"3. Cars must be thoroughly cleaned —nails removed from both floor and sides and any other sharp objects either well padded and covered or removed. If the car floor is particularly bad, reject the car.

"4. It is desirable to cover the car floor with a proved grade of liner. Whether or not the sides should be covered will be dictated by circumstances.

"5. Paper bags must always be loaded flat. Never on their edges or ends.

"6. The most important point, if one can be more important than the others, is always to load tight. This will make for ease and accuracy in checking the count on the car and will prevent undue shifting of the load, regardless of how rough the car is handled in transit.

"7. Most, if not all, methods of loading employ a narrowing of the load between the car doors, the purpose being to prevent the doors of the car from tearing bags when the car is opened at destination. This particular portion of the load should be so keyed that it will not fall to one side or the other."

Roebling, Wire-Rope Maker, Observes 100th Anniversary

ONE HUNDRED years is a long time measured by any but geological standards. In industrial history it carries back to a romantic period in American progress. In 1841 William Henry Harrison was succeeding Martin Van Buren as the ninth president of the United States; Texans were celebrating the fifth anniversary of the Battle of the Alamo; gold had not yet been found in California. Yet John A. Roebling, immigrant German engineer, working his farm near Saxonburg, Pennsylvania, was making wire rope to replace the hempen hawsers on the Pennsylvania canal. A century later, on September 19 of this year, his great grandson, John A. Roebling, and other members of the Roebling family, were hosts to nearly a hundred business-paper and magazine editors at an anniversary party celebrating the completion of the first hundred years of the history of the John A. Roebling's Sons Company. It signalized the passing of the greatest milestone in a drama of industry, made possible, as the present John A. Roebling testified, by the frugality and penny-by-penny economizing of the founder's mother, whose self-sacrifice and good management provided the means for educating him at the university and the Polytechnic Institute in Berlin. How well her faith was justified is attested to-day by 258 factory buildings devoted to the manufacture of Roebling products, a business that had its humble beginning in a small frame building in a Pennsylvania meadow.

The Brooklyn bridge, designed for the light traffic loads of the late 1860's, and yet to-day successfully carrying the heavier and more voluminous traffic of a motorized age 60 years later, was built by Roebling, the founder, and cost him his life. His successors completed the work he had begun, made the cables for the George Washington bridge linking New York and New Jersey and the Golden Gate bridge at San Francisco. To-day it manufactures, in addition to wire rope, woven-wire products which find wide use in many industries and electrical cables, as well as many special products, such as submarine nets, essential to American defense.

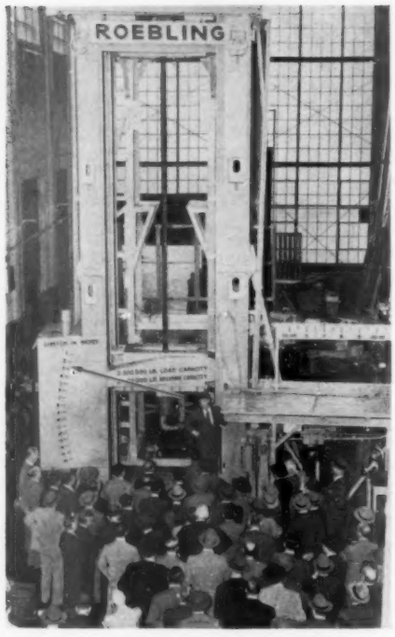
Roebling's guests on this memorable anniversary were given abundant evidence, not only of the Roebling standards of quality manufacture, but also of the spirit of hospitality, friendship and active coöperation that pervades the Roebling organization. Each guest on arrival at the Roebling offices that day was assigned to a Roebling host, who made himself personally responsible for the visitor's comfort and entertainment. After a lunch in the company's top-floor restaurant, a fleet of numbered cars, each driven by a company host and escorted by New Jersey State highway police, carried the guests on a trip to the town of Roebling (about 12 miles from Trenton), where the company's 417 acres of plant space and 258 factory buildings are located. There they were taken through some of the plant's many departments—steel mill, blooming mill, rod mills, wire mills, woven-wire-fabrics division, copper mill, rubber mill, cable shop, rope shops, rope-testing rooms, etc.—and, through the courtesy of the Navy Department, were allowed to witness the manufacture of the woven-wire nets designed for protecting ships and harbors from submarine attacks. Another interesting activity shown is the making of De Gaussing cables, which, placed aboard a ship, neutralize its influence on magnetic mines.

In the course of their visit to the company's laboratory the guests saw a piece of Roebling wire rope 4 inches in diameter subjected to a severe breaking test. Under the strain imposed by a huge testing machine the rope was stretched more than 10 inches in length and finally broke at a pull of about 1,600,000 pounds.

Following the tour of the plant, the visitors were taken to Princeton, New Jersey, where they had an opportunity to see the university campus, and then to the Nassau Tavern for the anniversary dinner. The guest speaker of the evening was Leon Henderson, administrator of OPM's Office of Price Administration. He spoke of the accomplishments of the Roebling family as evidence of the opportunities for free enterprise in America, and then pointed out that the country's all-out defense program is a gigantic effort to protect those opportunities for present and future Americans.

Mr. Henderson declared that "actual curtailment" of consumer goods production "is the only real answer" to the demands of such a program.

"But we in Washington also have a responsibility to see that reductions in output of civilian goods are not carried too far, to see that civilian morale



Visitors watch as a 4-inch rope withstands an 800-ton pull before breaking.

and civilian industry are not harmed unnecessarily," he said. "This means that minimum supplies of scarce materials must be reserved for civilian uses. You can't keep a civilian economy going, for example, without giving it some copper. Furthermore, hoarding of scarce materials by industry and governmental agencies alike must end. Some euphemistically call this 'protective buying'; but, call it what you will, it hurts the defense program and hurts the country. Already action has been taken in some cases to reduce the flow of raw materials to concerns holding huge stockpiles. Possibly we should go further and have some of those stock-piles taken away for redistribution to plants needing them urgently either for defense or essential civilian production. . . .

"There are those in this country who question the need of this [defense] effort. But I say to you the cry of 'Wolf' is real. There is a wolf abroad in the world to-day—a wolf with an insatiable hunger for land and power, a wolf whose eyes will turn to this hemisphere if he is allowed to work his will in Europe. To-day another battle is being fought at historic Trenton—a battle of production. The weapons in this battle are machine tools and the soldiers are free American workmen. The tories of our times are not men, but inaction, apathy, wishful thinking, ignorance and blindness to danger. Three thousand miles of ocean are a powerful soporific. Too many of us—including, I am sorry to say, some of those in Washington re-

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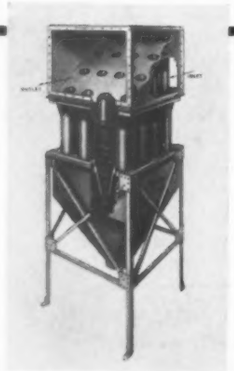

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A typical Multiclone tube assembly is illustrated in the cut-away view at the right.

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sponsible in part for the defense effort—have not in these past months realized fully the dangers which now threaten our way of life, the way of life which made possible the institution we have met here to-night to honor.

"But now at last there are convincing signs that, after 15 months, American industry is beginning to waken and to throw the full weight of its productive capacity into the task of winning this battle in defense of the principles of Democracy. There is a new spirit in Washington. During the past few weeks there has come a clearer realization of what is required from industry, from labor, from the rank and file of American citizenry if we are to win. There is growing recognition of the clear fact that 'business as usual' is out.

"There was a time when we could have done much more to increase our supplies of civilian goods. We could have carried through vast expansions in our capacity to produce basic raw materials in those months before defense demands became so heavy. Much can still be done, but the bulk of our effort will have to go largely into production of armaments. . . .

"As our production of armaments increases our output of civilian goods, particularly those goods made of raw materials which compete with defense, must be curtailed; manufacture of armaments must take their place. Already this shift from peace-time to war-time production has occurred to some extent in a relatively few industries. It will be followed in many others, particularly those manufacturing durable consumer goods. Industry is beginning to feel the squeeze and will feel it increasingly in months to come. Priorities will take their toll of those companies, particularly in the metals-fabricating lines, which have no defense contracts.

"I see my job as primarily one of helping to preserve American institutions when the emergency is over. I don't believe this country can stand up under the buffeting of another long-drawn-out deflation. I don't believe we can preserve those conditions which made possible the foundation and growth of concerns such as the John A. Roebling's Sons Company if, after this emergency, we have to undergo such a period of stress and strain.

"The way to avoid that aftermath is to avoid its cause now. The pressures on the price structure are great. We will soon be pouring close to $2,000,000,000 a month into the production of armaments. Those dollars will flow in large measure into the pockets of working men and investors who will seek to spend them, not for guns and tanks and airplanes but for food, clothing, automobiles, washing machines and all the other thousands of necessities and luxuries making up our standard of living.

Leon Henderson chats with W. A. Anderson, president, at the speakers' table during the banquet.

"Those dollars will be flowing into the consumers-goods markets at the same time that the supply of goods coming into the markets will be decreasing. Such a condition breeds inflation. It must be met in many ways —by heavier taxes, by sales of defense bonds, by curtailment of installment credit, by forced savings, all of which sop up purchasing power. But these devices are not enough. Price controls must be used to supplement them. That's the story behind my particular responsibility in this defense program.

"My job is prices; and it isn't an easy job. During the past few months most of you have dealt with or have read about price schedules issued by the Office of Price Administration. These are regulations establishing fair and reasonable prices for commodities in which run-away price increases have actually taken place or have been threatened. Into each of these schedules has gone a great deal of work—in many cases weeks and months of analysis and negotiation, of discussion with members of the industry, of conferences with other government agencies.

"Moreover, since the beginning of the defense program careful consideration has been given to every major American industry, to the institutional background of that industry, to its price structure, to the major units in that industry, and to the source of its supplies. Problems in economics, which months ago looked like theoretical paper work, have now proved their usefulness.

"Because of careful groundwork, we have been able in many cases to avoid the hardship and dislocation that would have followed if exigent pressures had not been foreseen and anticipated. Nor does our work cease when a price schedule is issued. We are continuously trying to reduce paper work, to keep reports at the minimum, to simplify the schedule, to make it easier for business people and consumers alike to understand the schedule and to operate under it.

"To my way of thinking this, too, is defense—defense of American institutions, defense of our way of life, defense of freedom. And so I close with a personal plea to you—a plea for understanding of what we are trying to do, a plea for tolerance, for coöperation, and for support in the days ahead. We have a single goal, crystal clear: Preservation of our way of life. In that effort we and the nation stand united."

Mr. Henderson declared that John A. Roebling, founder of the Roebling company, was a "rebel against the hatred and the malignancy which prevailed in the Germany of a century ago and which Hitler has brought to life again. "It was in protest against that tyranny that John and his brother Karl came to the United States."

Other speakers at the dinner included William A. Anderson, the Roebling company president, Charles G. Williams, executive vice-president, and John A. Roebling, great grandson of the founder.

Each guest received as mementos of the occasion a beautifully printed copy of *The Roebling Story* and an ash tray made by the world-famous Lennox potteries in America.

Alleges Carelessness Caused Plant Blaze

The J. J. Mayou Manufacturing Company which operates a bentonite plant near Newcastle, Wyoming, has filed suit in district court at Newcastle seeking $83,005 damages from the Consumers Oil & Refining company.

The suit is the outgrowth of a fire last spring which destroyed the bentonite plant of the plaintiff. The compaint charges that Ralph Millhouse, a driver for the refining company, was careless and negligent in filling a fuel-oil supply tank at the bentonite plant.

Another Quarry Plant Acquired by Columbia

The limestone quarry formerly operated by the Crystal Carbonate Lime Company near Elsberry, Missouri, has been acquired by the Columbia Quarry Company of St. Louis.

Mechanical improvements are to be made by the new owners. It is expected that a large part of the output will be marketed in the form of agricultural stone.

PERSONAL MENTION

R. A. HUMMEL, formerly executive vice-president, has been chosen president and general manager of the Lone Star Cement Corporation of New York City. He succeeds the late Charles L. Hogan.

BURTON A. FORD is in charge of the new Baltimore branch office of the St. Regis Paper Company, Taggart Corporation, and Valve Bag Company, located in the Baltimore Trust Building. Mr. Ford will operate as manager of the southeastern division for St. Regis Paper Company and the Taggart Corporation. He will continue to function as sales manager of the Valve Bag Company, and will serve the lime companies in Ohio and Pennsylvania as well as in the southeastern division, and also retain his industry relationships nationally with the lime producers.

LOUIS B. NEUMILLER, who began his association with Caterpillar Tractor Company of Peoria 26 years ago as a stenographer and blue-print clerk in the

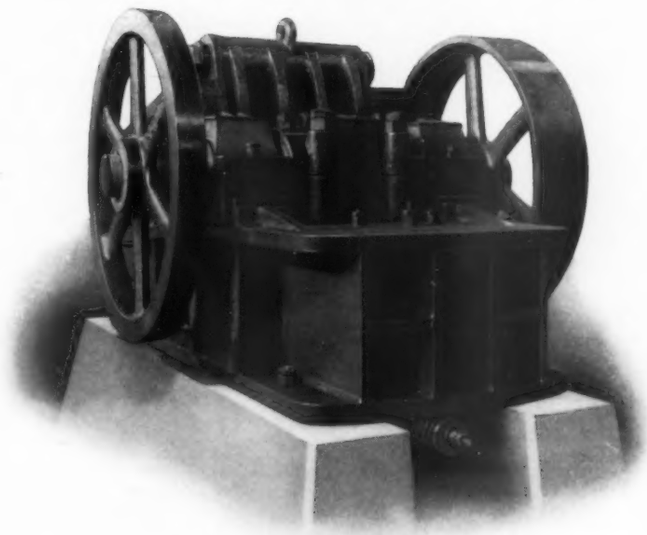
Louis B. Neumiller.

engineering department, has been elected president of the company by the board of directors. Mr. Neumiller succeeds B. C. HEACOCK, president since 1930, who becomes chairman of the executive committee.

G. K. VIALL, vice-president of the Chain Belt Company, Milwaukee, has been appointed head of a new Division of Research and Development now being organized by the company. B. F. DEVINE has been promoted from sales manager of the Construction Machinery Division to the position of manager of the Construction Machinery Division.

PETER WESTERGAARD, sand-and-gravel producer of Mt. Vernon, Indiana, has purchased the concrete-block plant formerly operated by LESLIE UTLEY and is operating the business.

TRAYLOR
TYPE H
JAW CRUSHER



it fills the bill!

★ HERE'S a jaw crusher that well warrants your attention, if you are interested in finer-than-usual crushing, at large capacity and lowest unit cost. The Traylor Type "H" Blake Jaw Crusher has (1) an all-welded steel frame, lighter, but many times stronger than older cast frames; (2) improved swing jaw suspension that saves wear and power; (3) curved jaw plates that enable finer crushing, in greater capacity at less power per ton than customary with jaw crushers.

★ The Type "H" machine is built in sizes up to 30" x 42" and thus has a wide range of application as a primary breaker for small and medium sized plants, and it is mighty economical to buy, too,—less than you may expect for such a "Crusher of Tomorrow."

★ You should investigate the Type "H"—closely. Our man is anxious to talk to you, and show records the machine has made. He'll tell you where you can see one at work, if you like. Write us today, making an appointment that suits your convenience.

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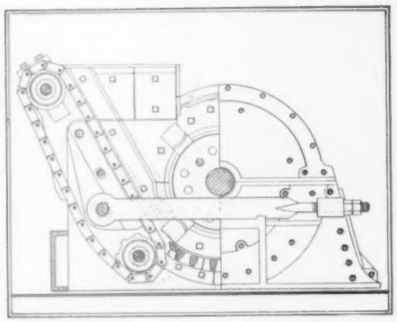

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To really test a crusher's efficiency, feed it wet, sticky materials! And that's where a Dixie, with its patented Non-Clog Moving Breaker Plate shows its real merit.

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FREDERICK B. KILBOURN, vice-president and assistant general manager of the Canada Cement Company has been appointed controller of steel supply for the entire Dominion of Canada, his task being to regulate the flow of the vital war commodity from scrap-heap and mine to consumer. Surrounded by an advisory board, Mr. Kilbourn has been vested with power to see that war production is not jeopardized by normal steel requirements, and war implements are given absolute priority in steel supplies.

A. W. Thomas.

A. W. THOMAS has been appointed sales manager of the Construction Machinery Division of Chain Belt Company, Milwaukee, D. A. KALTON as assistant sales manager and A. J. FRANK as assistant to the manager of the division. All have been connected with the company for many years and have had extensive experience in the construction machinery field. Mr. Thomas succeeds B. F. DEVINE, recently promoted to be manager of the Construction Machinery Division.

J. N. EINMUNG of Wayne, Nebraska, has installed a Hollostone concrete block machine.

JAMES J. PENDERGAST, 71, secretary-treasurer of the Seneca Washed Gravel Corporation, Buffalo, and prominent in business and municipal life in Buffalo for more than 40 years, died at his home on October 2 after a short illness.

CARL F. BRUNT, 55, former manager of the Geneva Stone Company at Geneva, New York, died at his home in Penn Yan, New York, October 9, after a brief illness.

WAYMAN L. HESTON, 36, president of the Heston Certified Concrete Company, and the State Sand & Gravel Company, Indianapolis, died recently following a brief illness.

JOHN B. FORD, president of the Huron Portland Cement Company, Detroit, passed away on October 8.

VICTOR H. KOCH, secretary-treasurer of the Hug Company, Highland, Illinois, passed away a short while ago.

EDWIN NEARY, 50, president and manager of the Lakeside Gravel Company, Seattle, is dead following a sudden heart attack.

TRAFFIC News Digest

I. C. C. Reports

Cement — Fourth-section application No. 17681, cement from Knoxville, Tennessee. Division 2. Louisville & Nashville, Georgia Railroad & Banking Company operated as the Georgia Railroad by lessees; Atlantic Coast Line and Louisville & Nashville; Atlantic Coast Line, the East Carolina and the Virginia & Carolina Southern authorized by fourth-section order No. 14379 to establish and maintain on cement, in carloads, from Knoxville, Tennessee, to points on the Atlantic Coast Line in the Carolinas as described in an appendix to the report, over described routes, the lowest rates that may be constructed over any line or route from and to the same points on the basis prescribed or approved in Southern Cement Rates, 132 I. C. C. 427, 139, I. C. C. 484, 147 I. C. C. 303, and 188 I. C. C. 602, plus general increases authorized in 1937-1938, and to maintain higher rates from, to, and between intermediate points.

The report stated the applicants urged that, because they had relief to apply class rates and rates made uniform percentages thereof from Knoxville to the points considered in this application, over routes longer than those over which they had relief to maintain rates on cement, they should be granted the further relief necessary to permit the rates on cement to be applied over the same routes over which the class rates might be applied. The commission said it did not follow that relief also must be authorized with respect to all commodities over the same route, but that some relief would appear justified. In a concurrence Commissioner Splawn said that in his judgment the modification authorized did not go far enough and that it probably would create additional inconsistencies which could be avoided. He said a practical solution was to extend the relief to routes which did not exceed in length the longest routes over which relief was authorized in connection with the corresponding class rates from and to the same points.

Fourth-Section Applications

Docket 19295—Filed by J. R. Peel requesting fourth-section relief to establish rates on molding sand in carloads from Piggott, Arkansas, to points

in Michigan and Wisconsin to meet market competition. Schedule filed containing proposed rates J. R. Peel I. C. C. 3369, Supplement 19.

Docket 19307—Filed by W. S. Curlett and I. N. Doe pursuant to fourth-section order 9800 requesting fourth-section relief to establish rates on processed clay in carloads from points in West Virginia to points in trunkline and New England territory to meet carrier competition.

Docket 19322—Filed by J. G. Kerr requesting fourth-section relief to establish rates on lime in carloads from Spocari, Alabama, to points in the south to meet carrier competition.

Docket 19327—Filed by W. S. Curlett requesting fourth-section relief to establish rates on crushed stone in carloads from Security, Maryland, to Garrett, Myersdale, Sand Patch, and Rockwood, Pennsylvania, circuitous routes being the grounds for relief. Schedule filed containing proposed rates B. & O. I. C. C. 23158, Supplement 14.

Docket 19346—Filed by J. R. Peel requesting fourth-section relief to establish rates on sand, gravel, crushed stone, etc. in carloads between points in southwestern territory to meet carrier competition. Schedule filed containing proposed rates is J. R. Peel I. C. C. 3369, Supplement 23.

Central Freight Association

Docket 68277 (Carrier's proposal)—Crushed stone or crushed stone screenings in carloads from Carey, Ohio, to Ansonia, Gilberts, New Weston, Rossburg and St. Henry, $1.16 per net ton; to Coldwater $1.10; to Celina $1.05; to Tama $1.10; to Ohio City, Rockford, Van Wert, Cavatt, Cecil, Haviland, Paulding, Scott and Sherwood $1.05; to Bryan and Ney $1.10 net ton.

Docket 68298 (Carrier's proposal)—Stone (broken, rubble, rip-rap, quarry scrap, and crushed stone screenings). Cancel all rates published in New York Central Tariff 1902, from St. Paul, Indiana, to destinations in Illinois, Indiana, Michigan and Ohio on account of being obsolete.

Docket 68576 (Shipper's proposal)—Establish a rate of $1.90 per net ton on crushed stone in carloads from Mier, Indiana, to Aurora, Illinois.

Docket 68578 (Shipper's proposal)—Established on limestone, agricultural, unburned in bulk, in open-top cars in carloads, from Gibsonburg and Woodville, Ohio, to Mahoning and Mantua, Ohio, $1.54 per net ton; to Unionport, Ohio, $1.49 per net ton; to Waco, Ohio, $1.38 per net ton. Routes: *via* P. R. R. direct; P. R. R.—Warren, Ohio, Erie R. R.; P. R. R.—Canton, Ohio, W. & L. E. Ry.

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THE once necessary evil of using *heavier* pipe than was needed in order to obtain the required *strength*, was wiped out when Taylor Forge pioneered spiral pipe.

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MODEL 51

BLAST HOLE DRILL

What Blast Hole Drills Must Have

Factors that make blast hole for a well drilling machine are *power, weight of tools, stroke adjustment* and *shock absorption.*

Skillful operation is an additional requisite that the wise quarry superintendent will not forget.

KEYSTONE has for long years supplied to the quarry industry the best in well drill design and manufacture. No specification of material or fabrication is permitted in our shops to fall below the best available for the purpose intended.

The merited result has been recognized achievement in this field.

Keystone drill owners keep their Keystones.

KEYSTONE DRILLER COMPANY

Beaver Falls, Pa.

LABOR DECISIONS

Settlement

Cissell v. Great Atlantic & Pacific Tea Company, decided by the U. S. District Court, Western District of Kentucky, February 20, 1941; reported at 37 Fed. Supp. 913.

An employee bringing this suit received a payment of additional wages as a result of a settlement, approved by the court, in an earlier suit of the same nature, under the Fair Labor Standards Act of 1938, on behalf of another employee and other employees "similarly situated," as authorized by the act. In this suit the plaintiff employee sought to collect an additional amount, claiming that he was not bound by the settlement of the other suit, in which he was not named. The court, however, rules that since the earlier suit was for all employees "similarly situated," as authorized by the act, and since the settlement was approved by the court, the employee is bound by the settlement, and this suit is accordingly dismissed. Without the statute, says the court, the plaintiff would have no cause of action at all. "If he elects to take its benefits, he must accept its restrictions also."

"Poison"

National Labor Relations Board v. West Texas Utilities Company, decided by the U. S. Circuit Court of Appeals, Fifth Circuit, May 2, 1941, rehearing denied May 31, 1941; reported at 119 Fed. (2d) 683.

The court herein holds that the evidence supports an order of the National Labor Relations Board requiring the employer to cease and desist from persuading, coercing and intimidating its employees in the exercise of their right under the National Labor Relations Act. The production superintendent and chief engineer "took pains to advise . . . employees that union organizers were 'evangelists' who took money in return for nothing; that the company would refuse to bargain with the union; and that it would not be sympathetic in its dealings with union employees." Employees testified that the chief engineer "profanely told them that, unless they stopped the union organization, every man was going to be fired, and that the company would spend $500,000 fighting the union. Several witnesses testified that they had been shadowed and secretly watched by supervisory employees, who confessed to spying in order to prevent them from being 'poisoned with union propaganda.'"

The company is also held to have violated the act by dominating and interfering with the formation of a local association called the "Committee," and by discriminatorily discharging the union president. Certain other employees whom the board ordered reinstated, however, are found to have been discharged for legitimate reasons, and as to those employees the board's order will not be enforced.

Unfair Practices

Texarkana Bus Company, Inc., et al. v. National Labor Relations Board, decided by the U. S. Circuit Court of Appeals, Eighth Circuit, April 30, 1941; reported at 119 Fed. (2d) 480.

In this review the court sustains the decision of the National Labor Relations Board that the employer involved engaged in unfair labor practices by preparing and requesting its employees to sign letters renouncing a union as collective-bargaining representative, in requiring its employees to disclose their union affiliations, in discriminating in various ways against certain employees because of their union activities, and otherwise in coercing and interfering with its employees' union activities. The board also determined that the employer had been guilty of an unfair labor practice in refusing to bargain collectively with a union representing its employees. The court holds that the

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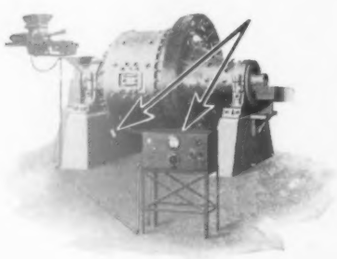

Bulletin 42

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COMPANY, INCORPORATED - YORK, PENNSYLVANIA
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The TY-ROCK
FULL FLOATING
CIRCLE THROW
SCREEN

Coarse and Medium Sizes
Live Rubber Mountings
No Escaping Vibration

HIGH TONNAGES OF ROCK

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That EXTRA Winning Point in Fine Mesh Screening

Like the "triple-threat man" who can kick, run and pass, TRI-VIBE gives triple-powered vibration to the free-swinging screen jacket and increases the *scoring efficiency* of the LEAHY Type C No-Blind Vibrating Screen in the production of *fine mesh* materials. Get that extra capacity and economy by specifying the LEAHY Tri-Vibe-equipped Screen.

Ask for Bulletin No. 14-H

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employer was not guilty of an unfair labor practice in that regard because the union refused to produce any proof that it represented a majority. "As the employer must act at his peril in recognizing a representative, common prudence dictates that he refrain from acting until satisfactory proof is produced that the representative in fact speaks for a majority of the employees." However, since the inquiry showed that the union does represent a majority, the portion of the board's requiring the company to bargain with the union is allowed to stand.

The evidence is held to sustain the board's decision that a strike at the petitioner's plant was caused by unfair labor practices under the provisions of the National Labor Relations Act, and that the employees concerned were discharged in pursuance of those practices and not for having committed acts of sabotage. An order of the board requiring the company to cease and desist from the unfair practices and to offer reinstatement with back pay to the employees involved is affirmed.

Espionage

National Labor Relations Board v. Illinois Tool Works, decided by the U. S. Circuit Court of Appeals, Seventh Circuit, February 27, 1941, rehearing denied May 17, 1941; reported at 119 Fed. (2d) 356.

The National Labor Relations Board ordered the respondent employer to cease and desist from employing labor spies. The court finds that two former employees were discharged when their names were published in a list of persons who had practiced industrial espionage, but that no evidence showed that they had been employed by the respondent for that purpose, and that the order was otherwise without support in the evidence.

Another portion of the order required the respondent to offer reinstatement with back pay to an employee who, the board held, had been discharged for joining and assisting a union. The court finds that the discharge was caused by the employee's refusal to wear goggles in violation of rules. The order, consequently, was denied enforcement.

Injunction

Montgomery Ward Employees' Association v. Retail Clerks International Protective Association, Local No. 47, et al., decided by the U. S. District Court, Northern District of California, Southern Division, April 25, 1941; reported at 38 Fed. Supp. 321.

Negotiations between the employer and the unions who are defendants in this suit failed and the unions ordered a strike. The association which is the complainant was formed after the strike began; it filed a "petition for investigation and certification of representatives pursuant to Section 9 (c) of the National Labor Relations Act," and then brought this suit to enjoin the employer from bargaining or negotiating with the unions, and to enjoin the unions from picketing the employer, boycotting it, placing it on the "We Don't Patronize" list or declaring it unfair to organized labor. The claim for an injunction was based upon the theory that the act gave the association rights in a court of equity. The court denied the injunction, however, on the grounds that the act sets up its own procedure for adjudicating such matters through the board, and that the injunction is forbidden by the Norris-La Guardia Act.

Minority

National Labor Relations Board v. Brashear Freight Lines, Inc., decided by the U. S. Circuit Court of Appeals, Eighth Circuit, April 17, 1941, rehearing denied May 16, 1941; reported at 119 Fed. (2d) 379.

After a hearing upon charges of unfair labor practices brought by a union, the National Labor Relations Board concluded that the union did not repre-

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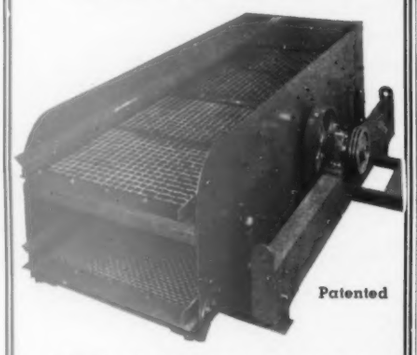

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MAKING NEW FRIENDS EVERY DAY BY DOING A BETTER JOB

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sent a majority of the employees concerned, so that refusal of the employer to bargain with the union was not an unfair labor practice. The employer maintained that at that point the complaint should have been dismissed. The board nevertheless concluded that the employer was guilty of other unfair practices charged, consisting of intimidation, coercion, and interference with the employees' rights of self-organization, and issued a cease-and-desist order. This, says the court, was proper; otherwise, "until a majority of the unit had chosen a bargaining representative, the employer would be free to do whatever he wished to prevent the employees' choosing such representative."

It is also held in this decision that where the sole reason for a strike was the employer's refusal to bargain with a union, and the union did not represent a majority of the employees concerned, the employer was not required to give reinstatement or preferential listing to the striking employees.

Impartiality

National Labor Relations Board v. Sparks-Withington Company et al. (United Coöperative Society of Jackson, Inc., intervenor), decided by the U. S. Circuit Court of Appeals, Sixth Circuit, April 16, 1941; reported at 119 Fed. (2d) 78.

The National Labor Relations Board ordered the respondent employer to cease and desist from dominating an organization of its employees and from giving effect to a contract with it. The court finds, hower, that the evidence does not show the domination complained of, and that the company had not given the inside union preference over an outside union; the order, consequently, will not be enforced. Various incidents which "sift down simply to instances of personal zealousness and individual bias against the (outside) union on the part of two supervisory employees," are held not to have represented company policy.

OCCUPATIONAL DISEASES and the LAW

Medical Care

Staller v. Staller et al. (Appeal of Commonwealth of Pennsylvania Second Reserve Injury Reserve Account), decided by the Supreme Court of Pennsylvania, June 30, 1941; reported at 21 Atl. (2d) 16.

The question for decision in this case was whether the term "compensation" under Section 7 (a) of the Pennsylvania Occupational Disease Compensation Act of July 2, 1937 (P. L. 2714, 77 P. S. Section 1101 *et seq.*), includes the supplying of medical and hospital services, imposing liability on the commonwealth's Second Injury Reserve Account for a part of that expense. The court points out that "The Occupational Disease Act is a supplement to the Workmen's Compensation Act and must be liberally construed along with it as a part of that humane legislation. In an occupational disease the medical expense conceivably might exceed the loss of earnings. If the commonwealth is not liable for a share of this expense, the employer is relieved also, placing the whole burden upon the employee, a result clearly not intended by the Act." By reference to the schedules of the Workmen's Compensation Act the court is convinced that compensation for occupational disease includes medical expense within the limits of Section 306 (e) of the Workmen's Compensation Act of June 4, 1937 (P. L. 1552, 77 P. S. Section 511 *et seq.*).

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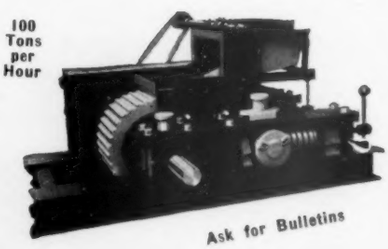
with NEW HOLLAND Super Roll Crusher

100 Tons per Hour



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This "big bruiser" will step up your production and cut down your crushing costs. Patented pulsating feeder doubles the output. Rib shell construction keeps dust at minimum.

Full line of Crushers, Pulverizers, Elevators, Conveyors, Screens, Concrete Mixers, V-Belt Drives, Belting, Motors, Engines, Castings, Power Lawn Mowers and Pick-up Baling Presses.

NEW HOLLAND MACHINE CO., NEW HOLLAND, Lancaster County PENNSYLVANIA

Constitutionality

State ex rel. Lourin v. Industrial Commission of Ohio, decided by the Ohio Court of Appeals, Franklin County, January 28, 1941; reported at 21 Ohio Opinions 266, 67 Ohio App. 300.

This was a mandamus action by which the widow of a workman who died from silicosis sought to compel the Industrial Commission of Ohio to grant her full compensation under the Ohio Workmen's Compensation Law, that is, as much as would have been allowed if the workman had died as the result of an accident. The commission's award of limited compensation was based on the provisions of Section 1465-68a, Ohio General Code limiting the compensation paid on account of the death or disability of a workman from an occupational disease in case the exposure amounts to less than five years after the effective date of the occupational disease amendments (July 1, 1937). The widow contended that that portion of Section 1465-68a was unconstitutional because of the discriminations involved, and the heart of the controversy, in the words of the court, was "whether the legislature, under the exercise of its power, given by the constitution, may provide a different and frequently a less rate of compensation for the death of one who has suffered from an occupational disease than is paid on account of the death of one who may have suffered an accident."

The court finds that under the constitutional provisions, the legislature has a right to pass such legislation as it may determine upon in reference to compensation for occupational diseases and to omit certain beneficial provisions that might relate to death from accident, and withhold them from the compensation for occupational disease, and that as to the occupational disease it has full power to provide such compensation and death benefits as it may deem just, even though it might result in different compensation to dependents of two workmen, each of whom died from an occupational disease, but one of whom might have been longer employed in the occupational than another. The portion of Section 1465-68a objected to is held constitutional and a demurrer to the petition is sustained.

There are now 10 bentonite plants operating in Wyoming, according to a survey just completed by the state department of commerce and industry, and sent to the Office of Production Management at Washington, D. C.

Other manufacturing plants now operating in the state include cement, 1; plaster, 1; phosphate, 1; alabaster processing, 2; vermiculite, 2; limestone quarries, 3.

NEW MACHINERY and SUPPLIES

● Scraper

R. G. LeTourneau, Inc., announces the Model DLS Carryall scraper, with a rated capacity of 8½ cubic yards struck and 11 heaped yards, for use with the new Caterpillar four-wheel tractor.

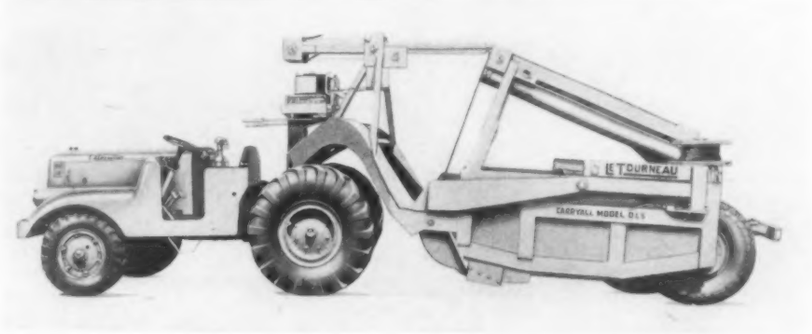
The Model DLS is very similar to the Model LS, which has proved so successful with the Model C Tournapull. It has the same steeper, longer blade base, which causes material to boil in and flow back into the bowl and forward into the apron.

The cutting edge is 8 ft. 6 inches. With the apron cable dead-ended on the apron, all hoist and unloading cables are now placed up and out of the dirt, eliminating abrasive cable wear.

The Model DLS is operated by cable from a standard LeTourneau power-control until specially adapted for use with the new Caterpillar wheel tractor.

● Haulage Unit

Notable advances in heavy hauling equipment have been made in connection with the development of the industrial type tractor which has the advantage of combined power, speed and maneuverability with the pivoting of the carrying unit on the tractor. Illustrating this latest development is the TriPull tractor and Maxi Muck Mover, designed by C. A. Col-



New scraper has a capacity of 11 cubic yards.

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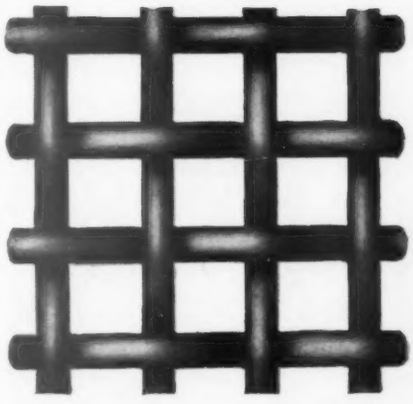
SCREEN
TRADE JERSEY MARK



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Roebling "Abraso" Screening is made of special steel—manufactured by *custom methods* in Roebling's own mill. It is steel that offers maximum resistance to the BEATING of stone and gravel.

To further assure long screening life, Roebling controls every step of manufacture from steel making to fabrication.

Roebling "Abraso" Screening is available for every sizing, cleaning and grading service.

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A hauling unit which has a capacity of 40 cubic yards.

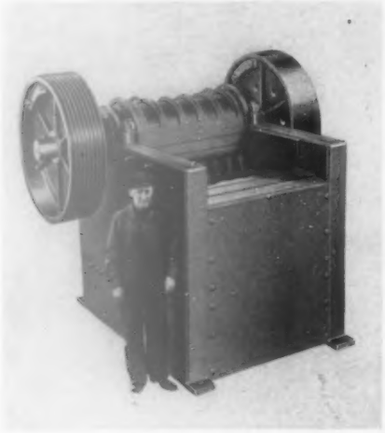
lender, chief engineer of Six Wheels, Inc., of Los Angeles and built by Six Wheels. This is one of the largest material-moving combinations ever placed on the market, and adapted for extra large loads, especially where the haul is "off the road."

The TriPull tractor has the speed of the modern motor truck, ranging from 2 miles per hour in low, up to 30 miles per hour in high gear, with sprocket sizes available for every speed and load-hauling situation. It also has the pulling power of the largest crawler-type tractors, and is equipped with a Waukesha motor, developing 225 horsepower on Diesel fuel.

Three distinct hauling jobs may be performed by the TriPull tractor—hauling the Maxi Muck Mover trailer, handling any large scraper or carrying an extremely large dump body on its back—hence the name TriPull. One of these in end-dumping position is seen in an accompanying photo.

The Maxi Muck Mover trailer has a bottom dump body with a capacity of 40 cubic yards heaped, and weighs 28,000 pounds. The rear end is carried on two walking beams, equipped with 18 by 24 inch tires. Each walking beam acts independently of the other, the oscillating action of this assembly eliminates rough riding and permits smooth flotation over rough haul roads. Air-operated brakes in each wheel assure positive braking action at all times. The bottom doors are cable operated by a two-drum power control winch. Each of the doors can be operated independently to regulate the discharge of the load. The dump body and the frame are built up with steel plates welded and the body is reinforced on the outside with structural shaped ribs. The clearance under the doors closed is 42 inches and the height to the top of the body is 9 feet 4 inches. A wedge shaped top extension or side boards are used and are removable.

The overall length of the tractor and trailer is 48 feet and the total weight 25 tons.



Pioneer Engineering Works, Minneapolis, announces a new, larger jaw crusher 30 by 42 inches in size. Modern materials, design and construction save more than 50 per cent. in the weight of this crusher as compared to other types of jaw crushers of similar size. Features include: SKF self-alining, spherical roller bearings; manganese-steel jaws; worm-and-gear adjusting mechanism; overhead eccentric.

Tractor with end-dump body raised.

● Vibrating Screen

The Bonded Scale Company of Columbus, Ohio, prominent makers of motor-truck scales, is having considerable success with its relatively new line of vibrating screens, offered for heavy and medium duty for all pit-and-quarry service.

Features of the screen are as follows:

(1) Mechanism self-contained and easily lubricated; (2) eccentric shaft vibrating mechanism; (3) self-aligning, spherical, SKF, double roller bearings, with dust tight housings for maximum life; (4) SKF housings seal and completely eliminate dirt, grit, moisture — but retain lubricants; (5) unbalanced weights on main shaft give efficient vibratory action; (6) screen cloth is held in tension and is reversible for longer life; (7) all revolving parts are enclosed assuring ample protection to workmen and meet safety laws; (8) engineered and designed to meet the requirements of every installation and to efficiently operate with minimum degradation consistent with efficient screening; (9) efficient

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FOR SAND, GRAVEL STONE, ETC.

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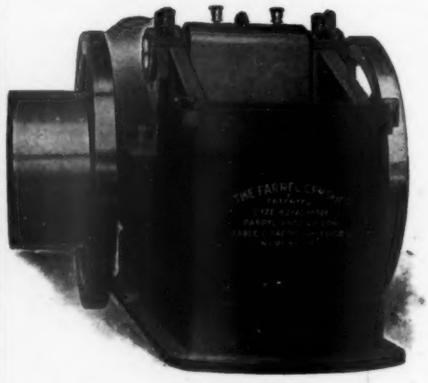
Complete plants designed and equipped, including Screens, Elevators and Conveyors. Machinery for Mines and Rock Quarries, Sand and Gravel Plants. Engineering Service.



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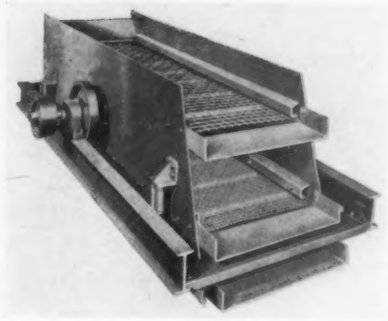

One of the double-deck screens.

screening over entire area—no "dead" spots.

The heavy-duty models are supplied up to five decks and in sizes from 3- by 8 feet to 4 by 10 feet. The medium-duty models are single, double or triple-deck and 3 by 6 feet in size. Other sizes can, however, be obtained on special order.

The National Supply Company announces the appointment of Walter A. Parrish as executive engineer of the Superior Engine Division, with headquarters at the Springfield, Ohio, plant. He has been prominently identified with internal-combustion-engine engineering for 30 years. In 1939 he joined the Cummins Engine Company at Columbus, Indiana, as Assistant Chief Engineer, serving in that capacity until his recent decision to accept this new position with the National Supply Company.

Trade Literature

The Correct Rope for Your Equipment. 4 pages. MacWhyte Wire Rope Company, Kenosha, Wisconsin.

New Holland Vibrating Screens, (Bulletin 404), 16 pages. New Holland Machine Company, New Holland, Pennsylvania.

Austin-Western Badger Convertible Excavator, 16 pages. Austin-Western Road Machinery Company, Aurora, Illinois.

Hoists and Bodies for 6-Wheelers, (Bulletin 8). Gar Wood Industries, Detroit.

Amsco Welding Products, (Bulletin 941-W) 12 pages. American Manganese Steel Division, American Brake Shoe & Foundry Company, Chicago Heights, Illinois.

Portable Belt Conveyors, (Bulletin 758), 16 pages; *Portable Bucket Loaders,* (Bulletin 759), 16 pages. Jeffrey Manufacturing Company, Columbus, Ohio.

Pioneer Conveyors, (Bulletin 600), 24 pages. Pioneer Engineering Works, Minneapolis, Minnesota.

MGC Motor Generators, 4 pages. Motor Generator Corporation, Troy, Ohio.

A-C Welding Enters Into Its Own, 8 pages. Electric Arc, Inc., Newark, New Jersey.

Catechism of Electrical Machinery, (Bulletin E100C), 48 pages. Fairbanks, Morse & Company, Chicago.

Drill-Vac . . . A Dust Control System for Rock Drills, (Bulletin 111), 8 pages. Spencer Turbine Company, Hartford, Connecticut.

Facts About Towmotor . . . the One-Man Gang. Towmotor Company, Cleveland.

Better Sizing Cheaper . . . with Plat-O Screens, 16 pages. Deister Machine Company, Fort Wayne, Indiana.

Recent Books

ENGINEERING ENCYCLOPEDIA. *Two volumes 6 by 9 inches. 1431 pages; 206 illustrations. Published by The Industrial Press, 148 Lafayette St., New York City. Price, $8.*

The Engineering Encyclopedia supplies, in condensed form, the essential facts about 4500 standard and special engineering subjects. Because of the scope and miscellaneous character of this two-volume work, it is, of course, impossible to describe adequately the contents. In general, it consists of concise treatises ranging from short paragraphs to several pages in length. These deal with various important mechanical laws, rules, and principles; physical properties and compositions of a large variety of materials used in engineering practice; the characteristic features and functions of different types of machine tools and other classes of manufacturing equipment.

All matter is arranged alphabetically under the heading or word likely to be referred to, thus making the Encyclopedia self-indexing. Whenever a subject might properly be placed under more than one heading, such additional headings are included with suitable cross references. There are also many cross references to whatever subjects may be closely allied to any given subject. While it obviously is impossible to cover every conceivable subject, this work of reference is unusual in its scope.

GENERAL ENGINEERING HANDBOOK, *by Charles Edward O'Rourke. 1120 pages. Published by McGraw-Hill Book Company, New York, N. Y. Price $4.*

A new edition of a popular work, fully revised and enlarged. This has been accomplished by expanding the basic sections and eliminating some of the more highly specialized chapters. The discussions of structural theory and design, engineering thermodynamics, and electrical engineering principles are much more complete in this edition.

In all, there are 19 sections written by 26 specialists.

PRINCIPLES OF SEWAGE TREATMENT—*By Dr. Willem Rudolfs. 128 pages. Published by National Lime Association, Washington, D. C. Price 50 cents.*

Prepared as a companion piece to the association's earlier and widely accepted text on water treatment, this book will make a special appeal to operators for its logical discussion of theory and methods of treatment. The author, Willem Rudolfs, of Rutgers University, has a remarkable ability in presenting ideas so that they can be quickly grasped and understood. His objective in this book is to serve those "who wish to know more about the composition of sewage and the principles of its treatment . . . but who may lack the time or the training necessary to become experts." Among the ten chapters of the book, one on microbiology and another on plant operating problems stand out as contributions of special merit.

MINERALS YEARBOOK, REVIEW OF 1940, *U. S. Bureau of Mines, Department of the Interior, 1459 pages. On sale only at the Superintendent of Documents, Government Printing Office, Washington, D. C. Price $2.*

"Minerals Yearbook" is generally held to be the official reference work and statistical record of the mineral industries, and this new volume in the series, containing 72 chapters prepared by nationally and internationally known specialists in the field of mineral economics and technology, presents the most thorough and detailed study of its kind.

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Heavy Armor plate steel or cast steel Constructed
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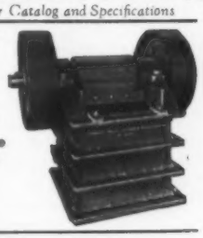
Small power Requirements



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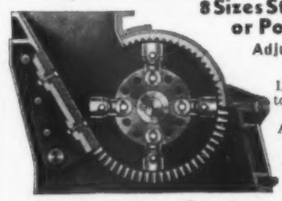
Adjustable

Crushes Large Stone to 2" minus Down to Agricultural Dust



Cross Section View of Pulverizer

FREE Bulletin—"Folks and Fields Need Lime"

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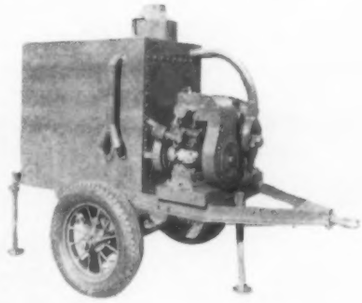

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KADCO CORPORATION
LONG ISLAND CITY, N. Y.

All the minerals classified as strategic or critical in the national defense program receive special consideration in the volume, and much information relative to such minerals, heretofore unavailable, is published for the first time.

Each of the minerals discussed in earlier volumes is covered and in many instances the coverage has been expanded. A new chapter, "Review of the Mineral Industries in 1940," presents a summary of the principal developments during the year and also a detailed historical record of the establishment and organization of the various Government defense agencies concerned with problems in the field of minerals, including the War Resources Board, Minerals Advisory Committee, Advisory Commission to the Council of National Defense, Office of Emergency Management, Office of Production Management, Office of Price Administration and Civilian Supply, and the Administrator of Export Control.

Another new chapter, "Effect of the International Situation on United States Trade in Minerals," discusses the stimulation of import trade by the national defense program, the control of exports essential to the procurement program, alternative sources of strategic minerals, and Latin America as a potential source of supply.

THREE MAPS: PORTLAND-CEMENT PLANTS, LIME PLANTS, GYPSUM PLANTS OF THE UNITED STATES, 1941. *J. H. H. Muirhead, 230 West 108th Street, New York, publisher. Price $1 and $1.50, unmounted.*

These three industry maps have again been revised and brought up to date. They show the location of all cities, towns and villages having plants of these industries and give a list of the companies operating in each place. (Location is of plants not offices.) When two names are given the second is the holding, operating or leasing company. Where advisable plant location is followed by the name of the postoffice.

In the case of Portland-cement plants prominence is given to the twelve districts of the United States Bureau of Mines. Each district is heavily outlined and colored. The list is arranged in accordance with these districts. Western plants are named on the left and eastern plants on the right hand side of the map. The lime and gypsum maps follow the same idea using the geographic divisions of the Department of Commerce which also places the Pacific states on the left with the New England states on the right.

The size of each map is 22 by 17 inches. The Portland-cement map is colored. Lime and gypsum maps are black on white.

STATEMENT OF OWNERSHIP

Statement of the ownership, management, circulation, etc., required by the Acts of Congress of August 24, 1912, and March 3, 1933, of PIT AND QUARRY, published monthly at Chicago, Illinois, for October 1, 1941.

State of Illinois, County of Cook, *ss.*

Before me, a notary public in and for the state and county aforesaid, personally appeared H. W. Baumgartner, who, having been duly sworn according to law, deposes and says that he is the business manager of PIT AND QUARRY, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the act of August 24, 1912, as amended by the act of March 3, 1933, embodied in Section 537, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:

Publisher, Complete Service Publishing Company, Chicago, Ill.; Editor, S. A. Phillips, same; Managing Editor, S. A. Phillips, same; Business Manager, H. W. Baumgartner, same.

2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent. or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given).

Complete Service Publishing Company, Chicago, Ill.

H. W. Baumgartner, same.
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4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the twelve months preceding the date shown above is ————. (This information is required from daily publications only.)

H. W. BAUMGARTNER,
Business Manager.

Sworn to and subscribed before me this 30th day of September, 1941.

[SEAL] RAYMOND S. SCHULTZ.

(My commission expires Jan. 25, 1943.)

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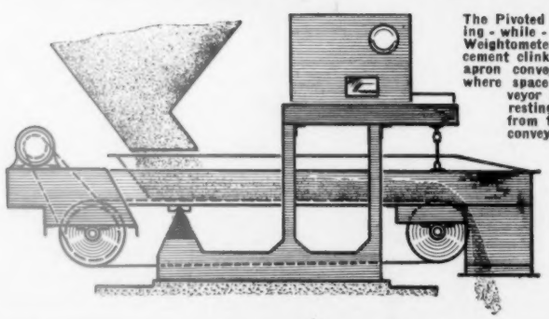
The Frog, Switch & Mfg. Co. CARLISLE, PA.

ESTABLISHED 1881

Weighing Cement Clinker Automatically



The Pivoted Weightometer possesses all the weighing-while-conveying advantages of the standard Weightometer. It is admirably suited to weighing cement clinker, and for hot clinker a steel pan or apron conveyor is used. It is designed for use where space is limited, having a weighing conveyor only 6 to 8 ft. long—the loading end resting on a fulcrum, the other suspended from the Weightometer. Tare weight of the conveyor is balanced out and the net weight of all conveyed material is accurately weighed and recorded.

Merrick Scale Mfg. Co.
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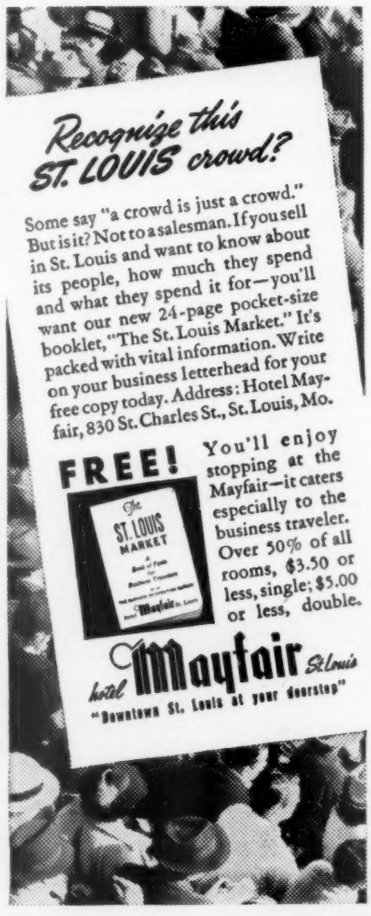
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November, 1941

The CONCRETE MANUFACTURER

A Special Section of ... JAYBEE

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Since its first appearance three years ago the *Concrete Industries Yearbook* has been in greater demand than the available supply. The 1942 edition, which goes to press December 15, will be revised to include the latest trends in the production and marketing of concrete products and ready-mixed concrete. New equipment will be illustrated and described. Catalog pages will present the new and improved equipment you will need in what is certain to be the busiest year the concrete industries have ever experienced.

Reach the men who buy in every worthwhile concrete-products and ready-mixed concrete plant . . . as well as in the related pit-and-quarry industries . . . over 8,000 of them in all. Traceable inquiries assured through the proved Quick Mail Coupon System. For further details, address:

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The CONCRETE MANUFACTURER

November, 1941

A SPECIAL SECTION OF PIT AND QUARRY DEVOTED TO PRODUCTION MARKETING AND USES OF CONCRETE PRODUCTS AND READY-MIXED CONCRETE

Published by Pit and Quarry Publications
538 South Clark St. Chicago

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Reinforcing Masonry Walls

On occasions during the development of the industry some cracking of walls has occurred which has been a source of concern for the architect, engineer and products manufacturer. Some three or four years ago, with the increase in the use of cinder and other lightweight blocks in low-cost residences, where the outside was finished with a Portland cement paint, a manufacturer conceived the idea that to avoid the possibility of these cracks appearing, it would be a good idea to use ¼-inch round steel bars on the outer and inner face shells of the walls, on the courses below the window sills, and also on the course immediately at the top of the lintel over the wall openings, these bars to be lapped well at the joints. The results obtained were so successful that in several hundred low-cost houses that were built not a single crack was seen. The cost of the finished wall was increased only slightly and the results were so gratifying that the builders continued their use in all the houses in the several operations. This improvement in wall construction has seen further development and to-day smaller rods, which have a tensile strength of approximately 100,000 pounds per square inch, tied together by cross rods that have been butt-welded to the straight rods, are being used. This development has been brought about since the demand for decorating directly to the walls. In such instances cracks are more noticeable and the desire to eliminate them is more pronounced. To-day the use of bars has become more common all over the country, and, although defense is moving into high gear and steel is rather hard to obtain, the importance of this construction places steel on the preferred list for defense housing. Quite a number of low-rent housing operations being built by the Federal Works Agency have employed these bars.

This method of construction has not only been employed in housing operations but is also used quite extensively in churches, schools and store buildings.

Products manufacturers all over the country are advocating the use of bars in all types of construction where the wall is left exposed or painted, so as to eliminate as much as possible the danger of these wall cracks that occasionally appear and for which no reasonable explanation could be found.

Builds Another Pipe Plant

The Universal Concrete Pipe Company, of Columbus, Ohio, has started construction on a $50,000 concrete-pipe plant at Decatur, Alabama.

The plant will occupy a five-acre tract on the Tennessee River near the Decatur Water Company properties. More than a score of pipe plants in the east, midwest and south use this company's methods.

Ready-Mix for Streets

The Transit Mix Company, new concern at Anderson, Indiana, is having a busy season furnishing ready-mixed concrete for paving about two miles of streets under the defense program.

These streets connect Anderson's defense industries not only with each other but also with all state highways. This work will probably be completed by November 15. Burke Brothers are owners of the firm.

Hollostone Plant Enlarged

Southern Nevada Industries' concrete-products plant at Las Vegas, Nevada, is being enlarged with the addition of a second Hollostone block machine to meet the growing demand for concrete units in Las Vegas and the Boulder Dam area.

The company also plans to start the production and delivery of ready-mixed concrete this fall.

Enlarges 5-Year-Old Plant

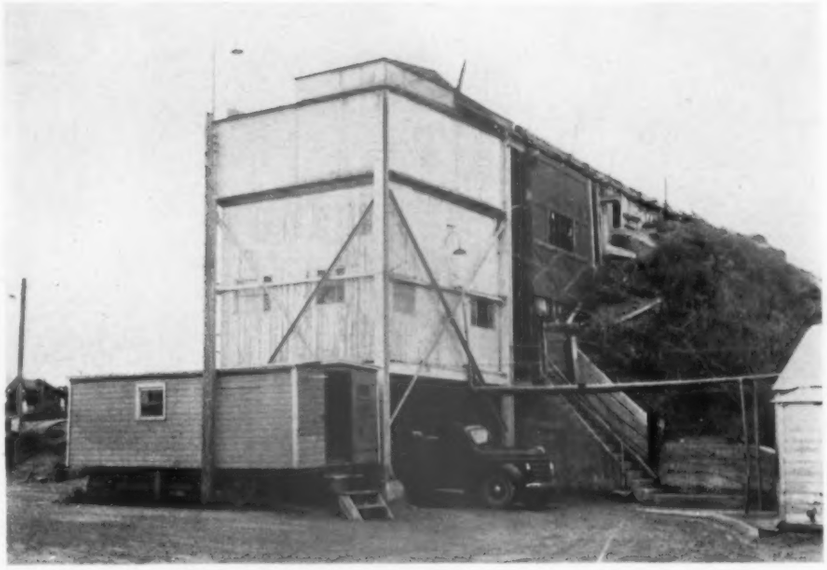
A 30- by 80-foot addition to its concrete-block plant is being erected by the Little Rock Lumber & Fuel Company of Alma, Michigan.

The plant was established about five years ago. Besser equipment is to be installed in the new addition.

Purchases Brick Machine

After being in the concrete-burial vault business for a number of years, R. E. Whitmore of Staunton, Virginia, has opened a small gravel plant. He has also installed a Brikcrete machine.

Contractor-Gravel Operator Adds Ready-Mix Plant



The ready-mixed-concrete plant with ramp above for loading the bins. Steam pipe at right.

Grizzly bars over the aggregate bin. Covered bin is for bulk cement.

The portable gravel plant showing conveyors to truck-loading bins. Cableway mast and pit in distance.

RAY SABLAIN had been engaged in the excavating and trucking business in and around Lansing, Michigan, for a number of years before he branched out into the road-building field. It wasn't long afterward that he began producing sand and gravel, largely for his own needs. And about three years ago, appreciating the advantages of ready-mixed concrete, particularly as applied to road building, he opened his first small batching plant.

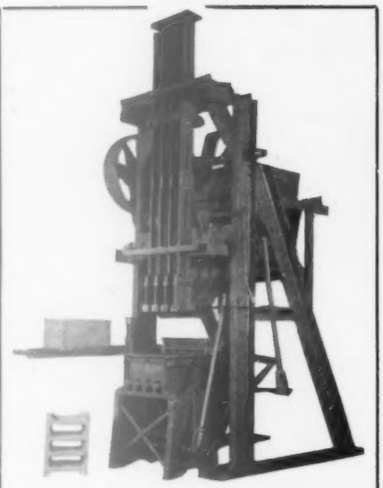
This plant, located near his Cedar Street offices, was not as popular with residents living in the neighborhood, because of the attendant noise, as it was with Mr. Sablain's customers. So, having decided to enlarge the scope of his commercial concrete operations anyway because of a steadily growing demand, he dismantled the equipment and erected a new and modern plant at his gravel deposit just outside the southeastern limits of the city.

The new plant, supplied complete by the Butler Bin Company, is located on the side of a hill and materials are moved entirely by gravity. Aggregates, produced on the property, are carried to the top of the plant by dump-trucks which discharge their loads directly into any one of three bin compartments which have a total capacity of 150 tons. Bulk cement is brought in by motor trucks and is discharged into the covered cement bin from the same ramp. George F. Alger, Detroit, serves the plant, as well as a score of others in southeastern Michigan, with his fleet of trucks pulling special bulk-cement semi-trailers which have a capacity of 85 barrels. They are equipped with screw-type unloaders.

The batching equipment consists of a 3-beam scale for weighing out aggregates and a single-beam scale for cement, each equipped with a tell-tale pointer. Water is measured by volume from a 125-gallon tank on the batching floor. A boiler-house, which is part of a large T-shaped corrugated-steel structure used by Mr. Sablain to house his trucks and construction equipment, supplies steam for heating the ingredients in the winter.

Fourteen truck-mixers, eight Jaegers and six Chain-Belt Rex units, comprise the mixing-and-delivery fleet. Five of these units are of 3-cubic yard capacity and nine are rated at 2½ cubic yards. All are mounted on International chassis. While deliveries are confined almost entirely to the city of Lansing, concrete has been supplied recently to a number of bridges and highway

By HARRY F. UTLEY



An All-Purpose Machine

The Junior Stripper will turn out more blocks per man than any other hand-operated machine on the market . . . 200 per hour being easily maintained! Nor has quality of output been sacrificed for the sake of speed. Units are uniformly dense, true to shape, of uniform texture.

Hobbs block machines, Anchor tampers, Anchor Jr. strippers, Stearns power strippers and Joltcrete, Stearns mixers, and Cast Iron and Press Steel pallets Straublox oscillating attachments, etc. Repair parts for: Anchor, Ideal, Universal, Stearns, Blystone mixers and many others.

ANCHOR CONCRETE MACHINERY CO.
G. M. Friel, Manager — Columbus, Ohio

ONE Machine for ALL Size Pipe

Cut your costs of concrete pipe production by using the same machine for all sizes from 6" to 60".

Universal "all purpose" concrete pipe machine produces quality pipe at lowest cost, because it requires smaller investment, insures greater footage per bag of cement, and more pipe per man.

Start the concrete pipe business with Universal equipment, and you will be sure of maximum profits.

Write for Bulletin

UNIVERSAL CONCRETE PIPE CO.
Columbus — Ohio

The garage and shop building. Wing at right houses boiler for heating concrete ingredients.

underpasses built by the Michigan Highway Department. It was on one of these jobs, at Stockbridge, that the company made its longest delivery on record—33 miles one way!

As mentioned, the sand and gravel used at the batching plant are produced on the property. The materials are taken from a deep, wet pit by a 1½-cubic yard Sauerman slack-line cableway excavator electrically operated from an 80-foot steel mast. Processing is done in an Austin-Western portable plant equipped with a multiple-deck screen and screw-type washers. A Universal jaw-crusher alongside crushes the screen rejects. A separate flight conveyor classifies and dewaters the sand. A Buda gasoline engine supplies power for the plant and a McCormick-Deering gasoline engine drives the crusher. Three portable belt-conveyors carry the finished materials to three portable truck-loading bins. Two Barber-Greene loaders and a Lorain 55D shovel are also used to load from

Batching levers and scale. Operator at left is weighing out cement.

open storage and to clean up around the piles.

Mr. Sablain operates another Austin-Western portable plant at another gravel deposit northwest of Lansing.

William Ingler is in charge of the main gravel plant with Jack Shaw supervising the ready-mixed-concrete operations.

Crusher alongside the gravel plant.

Hoopeston Firm Equips Building to Make Vaults

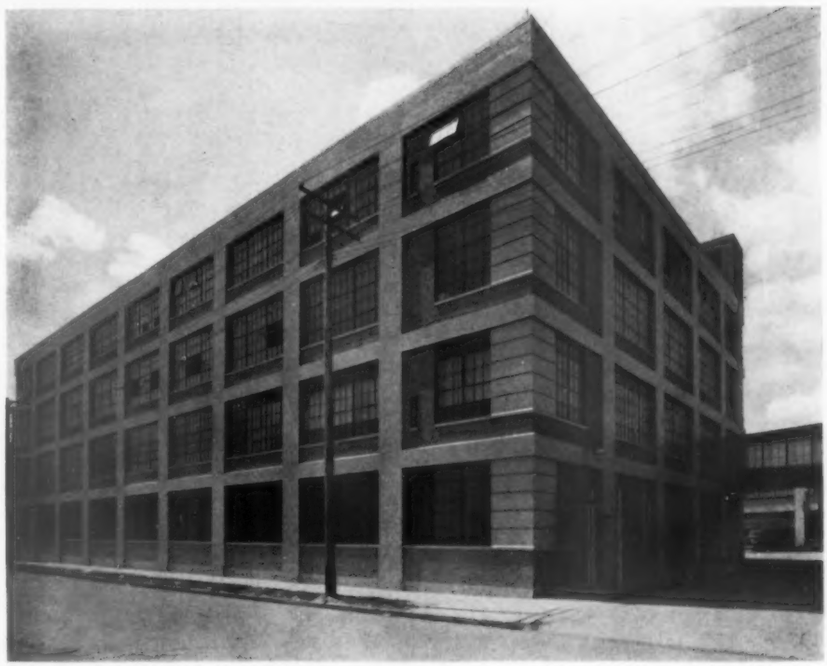
The Hoopeston Concrete Products Company, Hoopeston, Illinois, recently acquired an industrial building which it is equipping for the manufacture of concrete burial vaults. Walter Trego is head of the concern which has been manufacturing concrete blocks since 1937.

J. P. Burroughs & Son of Flint, Michigan, have opened a new ready-mixed-concrete plant served by six Jaeger truck-mixers.

The firm has dealt in fuel and building supplies for a number of years.

AGGREGATES produced at the plant of the Michigan Limestone & Chemical Company, Rogers City, Michigan and utilized in the preparation of ready-mixed concrete by a subsidiary, the E. B. Metzen Transit Mixed Concrete Company of Detroit, are playing an important part in the extensive construction activity under way in Detroit this year.

Pictured here are three of the recently-completed jobs. Above is the plant of the Carboloy Company which required 7,000 cubic yards of concrete. At the right is the American Brakeblok plant and, below, a parking deck for patrons of the J. L. Hudson Company department store which utilized 2,500 cubic yards of ready mix. Other projects served were the huge Packard and Hudson government aviation-engine plants, a warehouse for the Hinde & Dauch Paper Company, the plant of the Firth-Sterling Steel Company, and a warehouse of the General Electric Supply Company.



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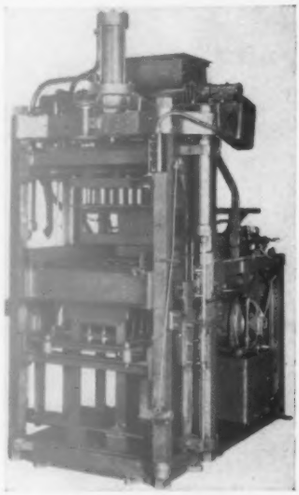
the LATEST
FASTEST
and BEST
PRODUCTION BLOCK MACHINE



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ALL SHAPES
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LOW in COST

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Firm Uses Limestone Fines Exclusively

For many years the Rockledge Products Company, Portland, Indiana, has been telling concrete users that concrete made with limestone and cement, without the addition of sand, will serve their purpose as well as any other concrete. Its concrete-products business has been helpful in this educational work, since all the output of its concrete-products plant is made with the limestone from its quarry, without the addition of sand.

In much of the street paving, as well as in many of the sidewalks in the city of Portland, limestone from this quarry has been used exclusively as aggregate, and the results have been more than satisfactory. In fact, contractors as well as others who have used it prefer it to the usual stone-sand-cement mix.

The company stocks its coarse aggregate in five sizes: Nos. 6, 7, 8, 10, and 11. All the particles that will go through a 3/16-inch mesh are stocked and used as fine aggregate for concrete products. It has been the company's experience that a better concrete results if the fines are not removed from the 3/16-inch particles, of which 3.38 per cent. will pass through a 200-mesh screen. When used for sidewalks, this fine aggregate is mixed with an equal amount of No. 8 aggregate, and a barrel of cement is added for every ton of stone.

The limestone is loaded into trucks by means of a 1½-cubic yard Bucyrus-Erie shovel on the quarry floor. The trucks carry the material to the crushing plant, which is equipped with a No. 7½ Telsmith gyratory crusher and a No. 2 Williams hammer-mill. Trucks carry the crushed material to storage. For loading from storage the company uses a Bay City ½-cubic yard shovel as well as two loaders which it designed and built, one being mounted on a 3-ton White truck and the other on a 1½-ton International.

To reduce maintenance costs on the two shovels several years ago the company started using Tru-Lay (preformed) rope for hoist cable. This rope, of 6 × 19 construction, is giving so much longer life than was obtained from non-preformed rope that its slight additional cost is more than justified. Also, it was found that preformed rope is not cranky and it does not tend to kink, and is therefore less apt to be damaged in operation or during installation.

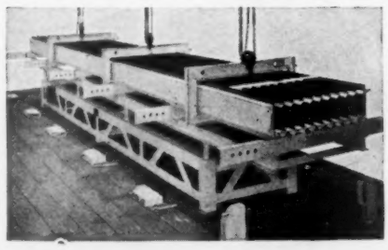
The company has its own machine shop, including an electric welder and a gas cutting outfit. This equipment is used not only for repair work, but also in the manufacture of the loaders, a concrete-block machine, a vibrator, and a mixer which the company built.

It also uses a Dunn tile machine, a Dunbrik machine, a Dunn mixer, a Dunn roofing machine, and a Dunn mat-glaze machine. For curing it employs two kilns, each about 70 feet long, 8 feet wide and 7 feet high. Steam for the kilns is provided by a 50-horsepower Scotch marine boiler.

Sometimes the company is asked to provide special products. For example, it recently made some cast gables for a milk house whose walls were constructed of its concrete bricks. These gables, being all of one piece, saved the great amount of labor that would have been required in the cutting, fitting, and laying of individual brick.

The company's concrete products are made with a mixture of one part of cement to four parts of aggregate. Both bricks and blocks consistently exceed 2,000 p. s. i. in laboratory tests with absorption never exceeding 6 per cent.

FOR SALE
Besser Victory, Fully Automatic, Block Machine with Attachments to make 2", 3", 4", 6", 8", 10" and 12" blocks, including 2,000 steel pallets. Price—$2,900 complete. Machine now in operation.
SCRANTON BUILDING BLOCK CO.
200 Green Ridge St. Scranton, Pa.



KIRK & BLUM
STEEL FORMS
for Concrete Joists

These forms are made in standard 20-ft. lengths. Also special lengths to meet individual requirements. The illustration above shows method of removing complete set of poured joists, which permits multiple production where desirable or feasible.

HEAVY DUTY VIBRATING TABLES can be furnished

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Jaeger, alone, offers maximum payload production of highest quality concrete in units with standard 2-Speed Transmission (Separate Engine or Vacuum-Controlled Truck Engine Drive), One-Shot Top Loading, Vacuum-Controlled High Discharge Door, End-to-End Water Sprays and Dual-Mixing in Sealed Drums. Also Combination Top or End Loaders for older or temporary plants not equipped for fast ribbon loading.
Send for complete catalog and prices — 2 to 8 Yd. sizes.
Combination Top or End Loader — to meet conditions. Only end loader that does not constrict drum opening or require moving Hopper to discharge.
Portable 2-3 Yd. Hopper: Eliminates waiting—averages 25% more payloads. Tows behind truck mixer.

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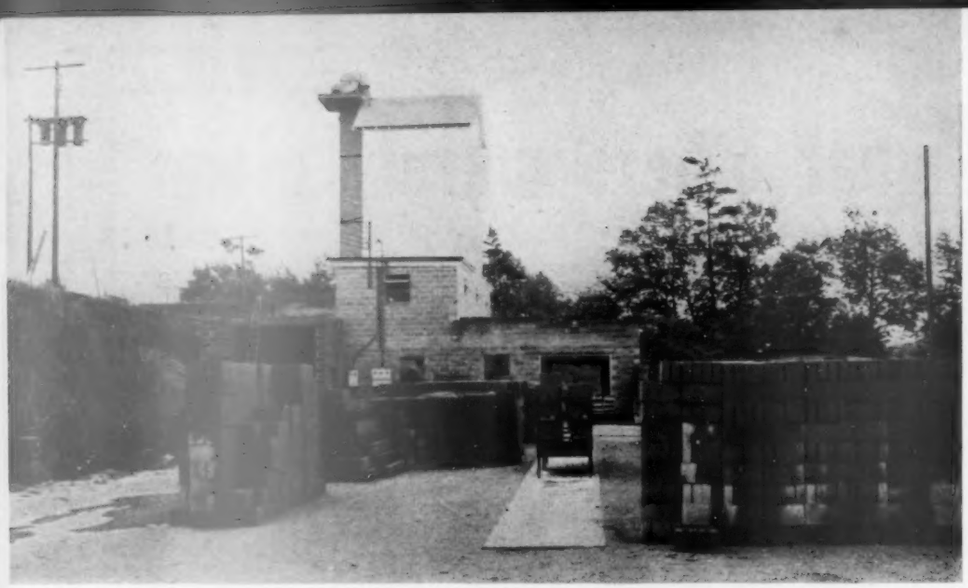
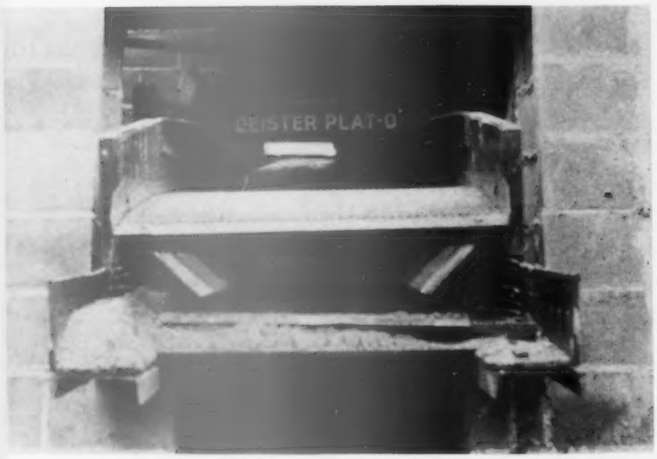


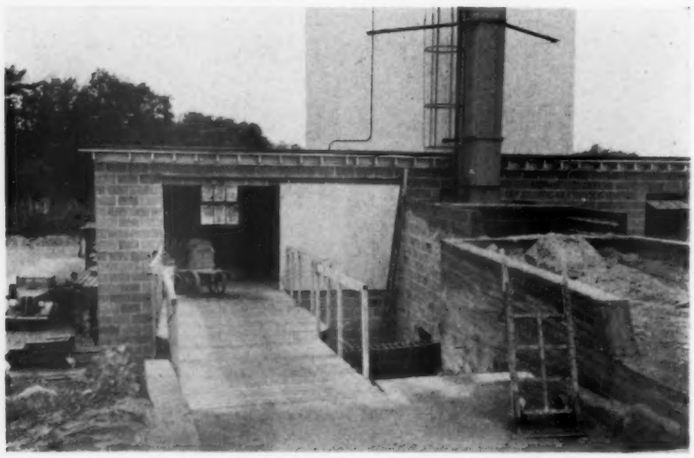
New Block Plant West Michigan's

1. B. A. Crandall & Son, pioneer concrete-block makers of Benton Harbor, Michigan, have just completed the up-to-date establishment shown at the left, located on the rim of the St. Joseph River Valley. It replaces an antiquated plant which, nevertheless, turned out millions of quite satisfactory units since it was built more than a quarter-century ago.

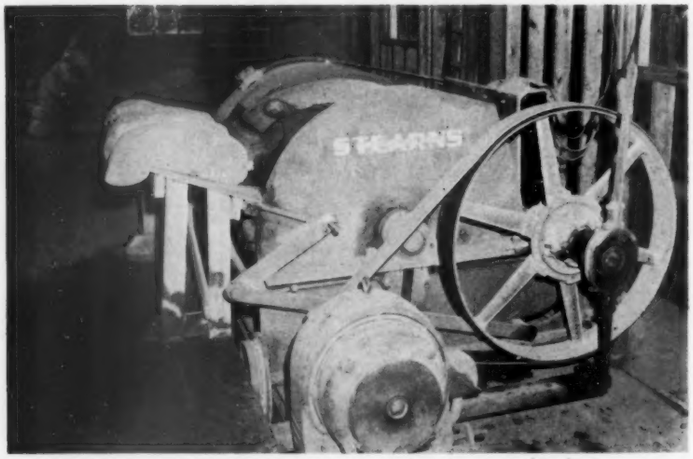
BY *Harry F. Utley*



2. The sand, gravel and Celocrete (formerly Pottsco) lightweight aggregate are discharged by dump truck into a hopper and pass through a Deister Plat-O vibrating screen (above) before being raised by the Columbus 50-ton-per-hour bucket-elevator (below) to the overhead bins. Gravel over ⅝ inch in size is rejected by the screen and used for fills, etc. Some of the natural aggregate comes from an adjacent 20-acre deposit owned by the Crandalls, while some is purchased. There are two storage compartments, each of 50-cubic yard capacity, one for gravel, the other for Celocrete. Hoppers and bin equipment were furnished by the Butler Bin Company. Provision has also been made for the installation of bulk-cement storage and handling equipment in the early future.



3. This view shows the receiving platform and runway for sacked cement which is being used until such time as the bulk-cement equipment is installed. A small truckload of cement can be seen through the door on the mixing floor. The hopper for receiving aggregates is at the right in the picture, inclosed with concrete-masonry walls. At the extreme left one of the fleet of Crandall trucks is being loaded in the yard.



4. The 27-cubic foot Stearns mixer is charged from manually-controlled gates under the aggregate bins; a weigh-batcher has been purchased, however, and by this time has probably been installed. An unusual feature is the installation of the mixer on flanged wheels so that it can be moved along tracks to discharge into the hopper of the block machine being operated. The movement is accomplished by electric power with push-button control. A 20-horsepower Master electric motor drives the mixer through five strands of Gates Vulcorope V-belting.

Serves Thriving Fruit-Belt Area

5. The new Stearns Model 9 Joltcrete machine (right) has exceeded its rated capacity, turning out more than 550 units in an hour—about as many as a half-dozen small machines could produce in the old plant in a half-day not so many years ago. A new Stearns stripper is to be installed alongside this machine before the end of the year.

6. Two lift-trucks, a Barrett (above) and a Lewis-Shepard, are used to move the Chase steel racks. The plant, kilns and yard are laid out so that no steps are wasted by the seven workmen normally employed.

7. Six curing rooms, 65 feet long, 7½ feet wide and only 6½ feet high, cure the blocks over night. Ceilings in the kilns are low so that the heat and moisture are kept down around the blocks where they can be utilized effectively. Tarpaulins close the plant ends while the "yard ends" are never opened, being permanently walled-up to conserve curing steam. The cured units are hauled out into the yard through two doors in the plant proper.

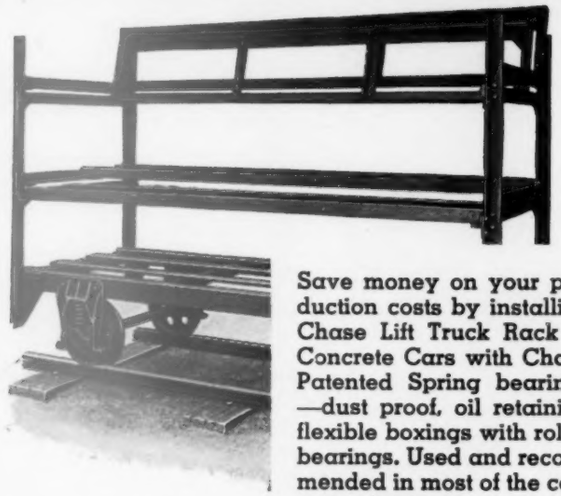
8. This is one of the concrete-paved runways leading into the yard. Additional runways are now being built, all being laid out for the efficient piling of units. Consideration has been given, too, to ease of loading the blocks. Two piles are so arranged that a truck can be loaded from both sides at one time. Crandall flat-bed trucks carry about 300 units each.

9. Besides operating the block plant, Bert Crandall and his son, Victor, own extensive and well-kept orchards. Peaches are an important crop. The spacious packing-house, where the fruit is cleaned, mechanically graded, and attractively packed in containers for shipment, is shown here. Needless to say, the packing-house is of concrete-block construction and, as the picture shows, various sizes of concrete units come in handy as supports for inspection tables, etc. Father and son and their respective families occupy two adjacent Georgian-style residences on Crandall Farms, about ⅛ mile down River Road from the block plant. At least 75 per cent. of the block output is sold through dealers within a 65-mile radius. Shipments are expected to exceed half a million units this year. Newspaper advertising and direct mail help make sales. Victor Crandall looks after production at the plant while his father spends much of his time making dealer contacts. Both manage to keep in close touch with the orchards, however, especially at harvest time, when scores of migrant pickers and packers are employed in rushing the fruit to market.

10. Crandall blocks of 30 years ago were used to build this dwelling across the road from the plant, now occupied by Ambrose Stump, assistant plant manager. A summer residence in the modern manner (below) has just been erected on an island in Pipestone Lake. Some of the first Joltcrete-made blocks went into its construction.

The CONCRETE MANUFACTURER

LOW INITIAL COST
LOW MAINTENANCE COST



Save money on your production costs by installing Chase Lift Truck Rack or Concrete Cars with Chase Patented Spring bearings —dust proof, oil retaining flexible boxings with roller bearings. Used and recommended in most of the concrete plants.

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Complete line of concrete block cars, decks, Lift Truck Racks, transfer cars, turntables, dump cars, etc.

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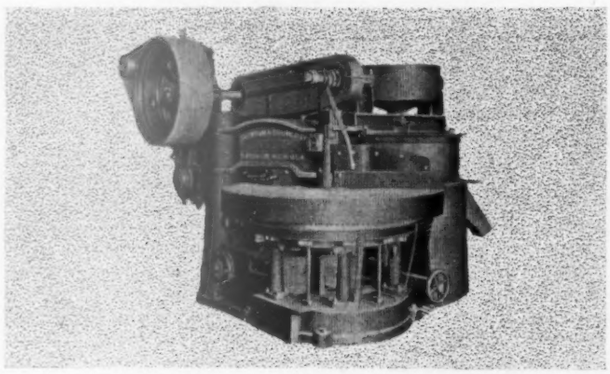
CHASE FOUNDRY & MFG. CO. COLUMBUS, OHIO

"It's really a BRICK!"
THE "J & C" PRESS
makes *better* Concrete Brick



Users say that they can make high quality concrete brick *faster* and *cheaper* on a "J & C" automatic machine.

All brick are accurately sized—have clean, uniform edges—are smooth textured, and high in strength.

Brick can be produced either vapor cured or high pressure cured. High pressure steam curing eliminates expense of yard stocking and aging. NO PALLETS USED.

Capacity of "J & C" Model "A" Machine, 3200 brick per hour. Capacity of Model "C" Machine, 1600 brick per hour.

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THE KIRKHAM VIBRATOR
is Producing Profitable Results!

The machine pictured here has produced approximately 120,000 blocks in five months.

This operator can charge off this investment now at three-quarters of a cent per block.

Production rate of 100-120 eight inch blocks per hour.

The high quality of these blocks has been a tremendous sales factor.

For full descriptive information on block machines, plant mixers, and truck mixers—write

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Check these features: super-strength, diagonal locking stave construction . . . steel hoop reinforced . . . immediate reaction . . . wide range of sizes . . . all guaranteed . . . easy dismantlement . . . thousands of actual installations to check for unbiased facts.

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RUSH JOBS ARE REX JOBS!

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IMMEDIATE DELIVERY!

If you act fast, you can have immediate delivery from our stock of 2- and 3-yard "Bigger-Batch" (conventional horizontal-type) Moto-Mixers! Think it over, if you have a job coming up! Then, wire us today for prices! Address 1646 W. Bruce St., Milwaukee, Wisconsin.

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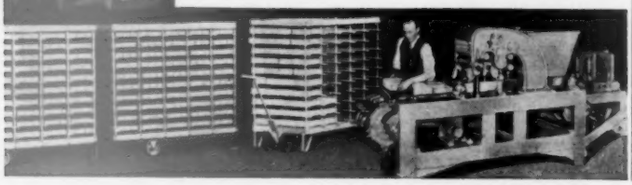

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Ball Bearing Concrete Pipe Machine, showing the sectional core which is the most economical core. By replacing only one section at a time which is a savings of 75% to the user.

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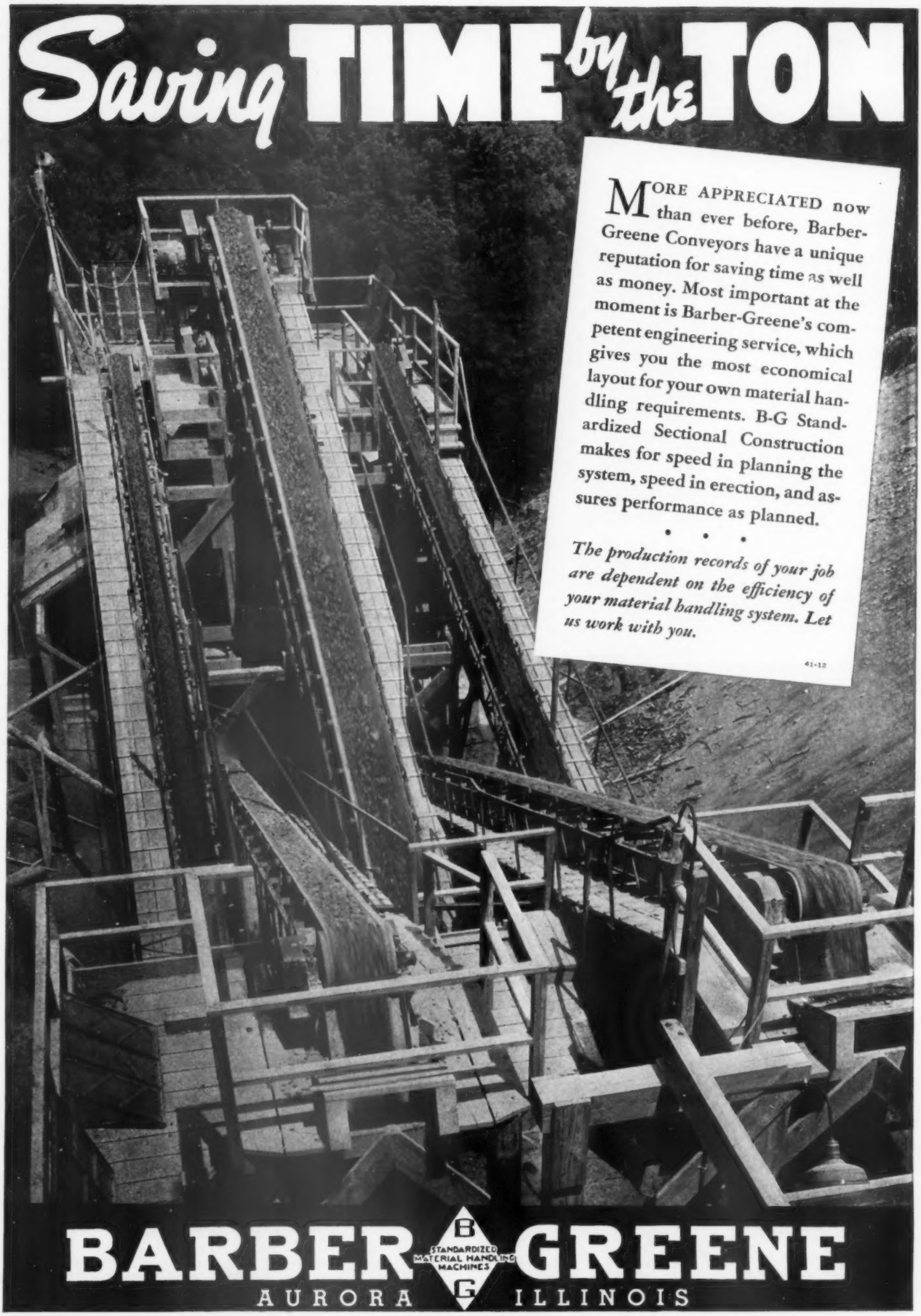

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The production records of your job are dependent on the efficiency of your material handling system. Let us work with you.

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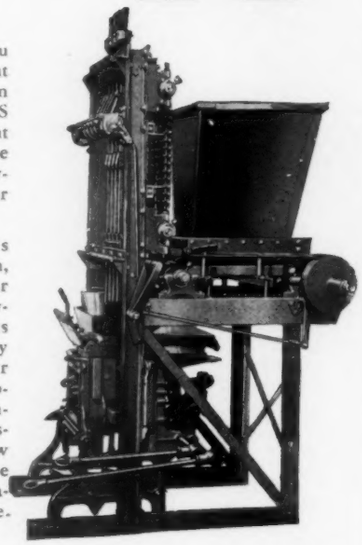
Miles CONCRETE EQUIPMENT

simple as A B C

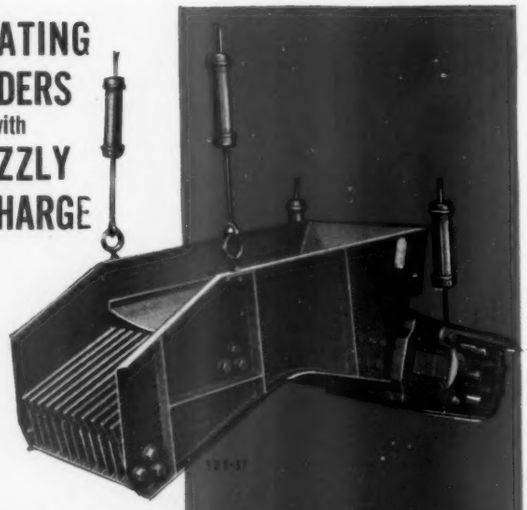
It isn't how MUCH you invest that counts, but WHAT YOU EARN on your investment. MILES Concrete Products Plant Equipment will insure increased output, at lower first cost and lower operating cost.

MILES equipment is simple in construction, yet ruggedly built for the severest kind of service. Expert mechanics are unnecessary . . . any workman can keep your MILES equipment operating in first-class condition at all times. Investigate! Get the facts now . . write for a complete catalog of MILES machinery for the concrete-products plant.



MILES MANUFACTURING CO.
JACKSON, MICHIGAN

VIBRATING FEEDERS with GRIZZLY DISCHARGE



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THE ORIGINAL DEMPSTER DUMPSTER BUCKETRUX

Drop Bottom Bucket in Carrying Position

Our entire organization, and plant, is exerting its complete effort in and for the National Defense Program.

We suggest that for operations where any materials are being furnished for defense work, and where efficiency can result in the reduction of hauling costs as much as 50%, that such plants follow the example set by many of the world's largest producers and install DEMPSTER-DUMPSTER-BUCKETRUX, the hauling unit with a multiplicity of detachable bodies.

Write for Information—Our Sales Engineers Will Serve You.

DEMPSTER BROTHERS, Inc.
Knoxville Tennessee

"IN THE ARMY NOW!"

This "BUTLER-BUILT" concrete batching plant is doing a big supply job on the Elwood-Kankakee ordnance project. The installation can produce more than 200 cubic yards of concrete per hour.

BUTLER BINS

are servicing

MUNITIONS PLANTS

To help meet national defense needs, the Elwood shell-loading plant and the Kankakee TNT plant are being rushed to completion. These adjoining projects, located within 50 miles of Chicago, occupy 50,000 acres and will cost $70,000,000.

The single concrete batching plant supplying all the construction requirements of both projects was "Built by BUTLER."

Whether the emergency is national or industrial, BUTLER engineers are qualified to design and install a concrete plant fully equipped to satisfy any production needs.

BUTLER BIN COMPANY
Waukesha, Wis.

(below) Part of Stewart Sand and Material Company's fleet of 10 Smith-Mobile Truck Mixers. Smith-Mobiles are available in 4 sizes, as truck mixer or as agitator. Write for Catalog 198-B.

"PROOF of the PUDDING"

As the old saying goes, "The proof of the pudding is in the eating." And by the same token, JOB-TESTING is the only satisfactory method of determining the true value of a truck mixer. During the past five years, ready-mixed operators everywhere have been putting the Smith-Mobile through its paces. Today, they KNOW it's okay. They're thoroughly sold on the HIGH DISCHARGE feature . . . the handy FEED CHUTE that really works . . . and VISIBLE MIXING that permits inspection of the entire batch before any part of it is discharged. No doubt about it, you can buy Smith-Mobiles with confidence. So, why gamble with new and untried truck mixers?

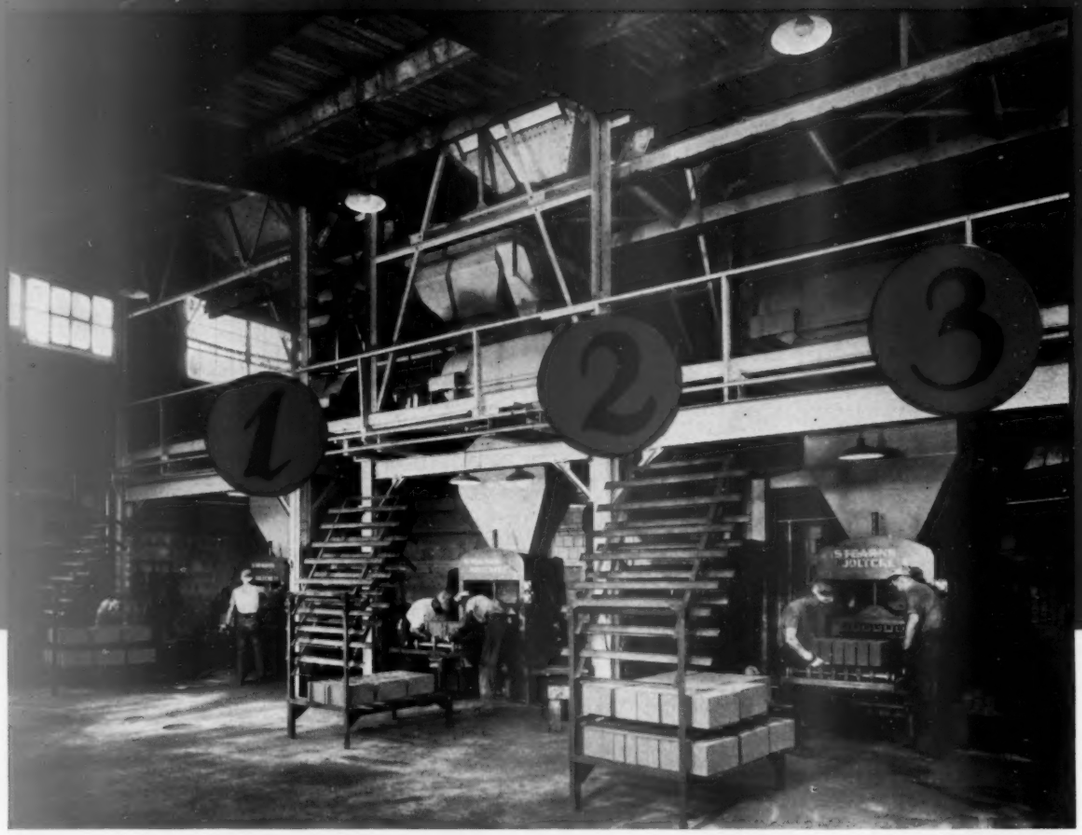
The T. L. SMITH COMPANY
2835 N. 32nd Street • Milwaukee, Wisconsin

SMITH-MOBILE *The Original High-Discharge* TRUCK MIXER & AGITATOR

A 3569-½H

The CONCRETE MANUFACTURER

Now they need THREE!



One after another, as their vibrated building block business grew, Cleveland Builders Supply Co., Cleveland, Ohio, have installed Stearns Joltcrete Machines. That's convincing evidence that these machines—pioneers in the quantity production of vibrated concrete masonry units—live up to the claims made for them.

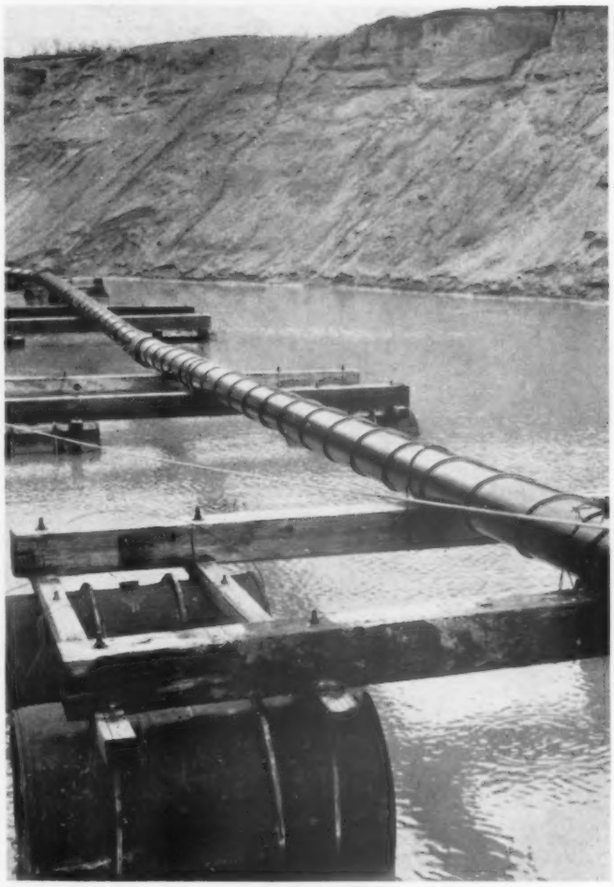
Write for bulletin describing Joltcrete Machines—there's a size to fit your need.

When you buy a block machine, Buy a Machine of Proven Worth!

STEARNS MANUFACTURING CO. ERIE, PA.

Ask also about Stearns Mixers—3 to 50 cu. ft. capacity—and Stearns Skip Loaders.

NAYLOR



Your Source of Supply for Sand and Gravel Conveying Lines

- No need to pay a premium for heavy pipe when Naylor Lockseam Spiralweld provides light-weight pipe with all the strength and safety you need for your sand and gravel conveying lines.

  You'll like the ease of handling and maneuverability of this outstanding light-weight pipe. Its accurate diameter makes the assembling of lines a simple matter and saves you time and trouble. That's why it will pay you to specify Naylor the next time you need pipe.

  Sizes range from 4" to 30" in diameter with all types of fittings and connections or special fabrication for your requirements. Write for Catalog or send specifications for quotation.

NAYLOR PIPE COMPANY
1257 EAST NINETY-SECOND STREET
CHICAGO, ILLINOIS

NAYLOR LOCKSEAM SPIRALWELD **PIPE**

Why Let Excess Weight Rob Your Dragline of its Digging Power?

Don't fool yourself that slapping some more iron on the lip, or arch, or back of your old, worn-out bucket will make it "good as new".

PATCHES CUT PRODUCTION! Every extra pound you weld onto the bucket means sacrificing that much "pay load". What's more, this "excess baggage" destroys the BALANCE of your bucket and reduces its digging ability.

BOOST YOUR PRODUCTION . . . Get the MOST out of your dragline . . . Get INCREASED PROFITS . . . Get a Page AUTOMATIC Bucket.

Fill in the coupon below for full details about a Page AUTOMATIC Bucket in the size and weight suited to YOUR job. DO IT NOW. MAIL TODAY!

PAGE ENGINEERING CO.
Chicago, Illinois

PAGE *Automatic* **DRAGLINE BUCKETS**

Page Buckets are built in sizes from ⅜ to 15 cubic yards capacity, and in three weight groups . . . a bucket for every job.

Address this Coupon to: Dept. A-32, Page Engineering Company, c/o Clearing Post Office, Chicago, Ill.

Without obligating me in any way, mail a copy of your new descriptive bulletin titled "Your Dragline CAN Move Dirt Faster."

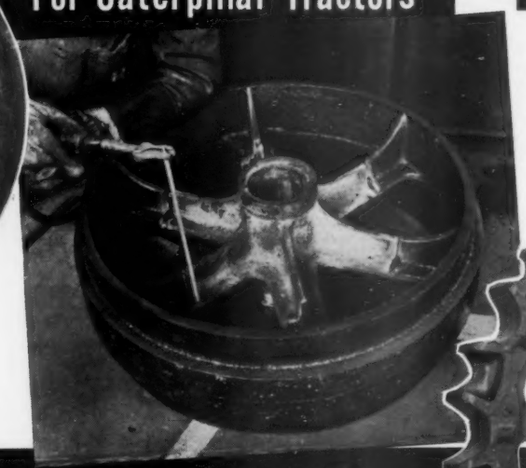
*Name*_____ *City*_____

*Street*_____ *State*_____

DURABLE MANGANESE STEEL

Renewable TRACTOR RIMS

For Caterpillar Tractors



When only the rims of those tractor drive sprockets and idlers have worn down, you'll save by welding on manganese steel renewable rims . . . They cost much less than the complete part and they're specially adapted for resisting destructive abrasive wear.

They Last Longer
They Cost Less

Alloy Steel & Metals Co.

Telephone LAfayette 0181

1862 E. 55TH ST. LOS ANGELES, CALIF.

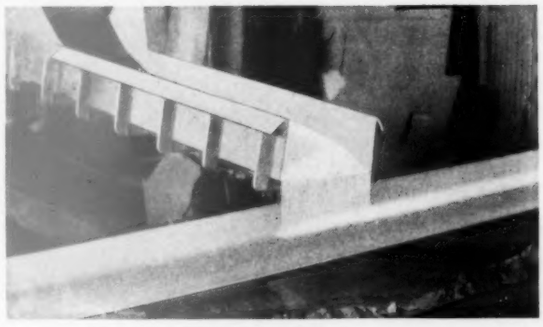
Manufacturers of PACIFIC CRUSHING & SCREENING UNITS • PACIFIC SLUSHING SCRAPERS & SHEAVE BLOCKS • Alloy-Manganese CRUSHER JAWS & MILL LINERS • PACIFIC ROCK BIT GRINDERS HAND WINCHES • CRAWLER SHOES, SPROCKET RIMS and Other Machinery Wearing Parts

SYNTRON

"Electro-Magnetic"

VIBRATORY FEEDERS

with Rheostat Control of Rate of Flow



Increase Production
Improve Product Quality
Cut Labor Costs
Increase Profits

In various sizes ranging from 500 tons per hour down to ounces per hour.

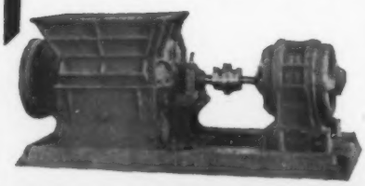
Write for new catalog of vibratory material handling equipment —hopper vibrators—feeders—conveyors—packers—constant weigh feeders.

SYNTRON CO.

385 Carson St. Homer City, Pa.

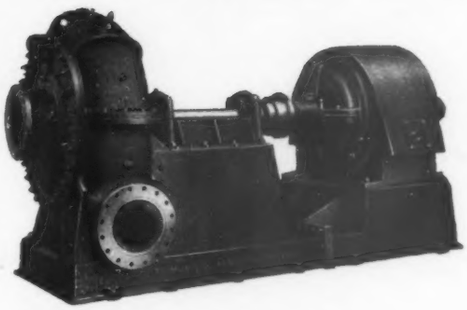
AMERICAN

For producing agricultural stone .... for reducing any one of a wide range of materials .... AMERICAN Hammermills and Ringmills get first call from experienced producers. Low-cost operation, uniformity of product, unbelievable endurance are AMERICAN by-words. Bring your crushing and grinding problems to us.



AMERICAN
Pulverizer Co.
1059 Macklind Ave.
ST. LOUIS, MO.

MORRIS
CENTRIFUGAL PUMPS



Heavy Duty Dredging Pump—one of the 12 different types of Morris Material Handling Pumps

are making records for high production, low power and maintenance costs in sand and gravel plants all over the country.

Write for service records and bulletin

MORRIS MACHINE WORKS . . . . *Baldwinsville, N. Y.*

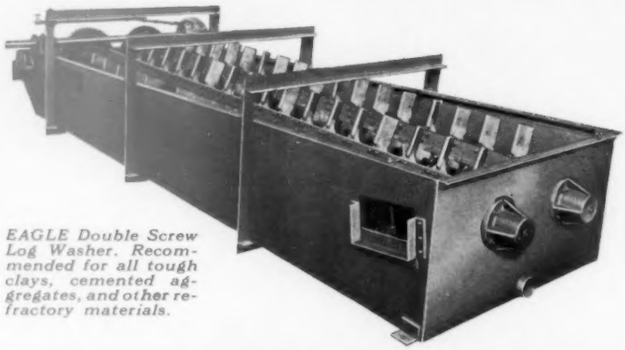
LIMA LOCOMOTIVE WORKS, INCORPORATED
Shovel and Crane Division
LIMA OHIO

In quarry work or wherever the digging is tough, LIMA shovels are in there producing big, profitable tonnage day in and day out. They ask no favors because they have what it takes to see the job through. LIMA quarry shovels have strong, sturdy front ends that can take tough digging without coaxing; power is not lost through long complicated gear trains; independent clutches make it possible to hoist, swing, travel and boom up or down simultaneously, and noise and gear wear is practically eliminated by the use of helical cut gears. In addition to the above advantages, friction is cut to a minimum by the use of anti-friction bearings at every vital bearing point. LIMA shovels are built in ¾ to 3½ cubic yard capacities. Bulletins are available on any size.

L I M A

SHOVELS — CRANES
DRAGLINES

BIG PROFITS ARE BUILT AROUND EAGLES



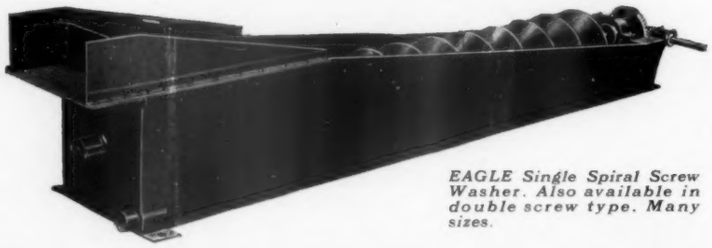
EAGLE Double Screw Log Washer. Recommended for all tough clays, cemented aggregates, and other refractory materials.

Profits in aggregate washing get a better "build-up" when EAGLE Washers are handling the job—because these machines have *built-in* features that stretch your investment dollar out to the limit of its value.

Many Sand and Gravel producers tell us that **EAGLES** are working all standard and even low-grade deposits with complete satisfaction, combining unique efficiency and output with a first-class product that meets all specifications.

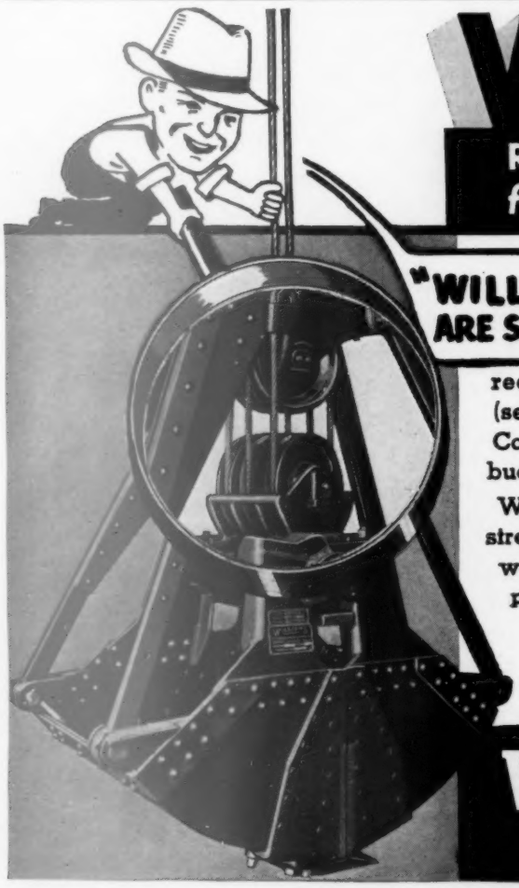
Every dredge operator should also read our Bulletin on the "Swintek" Screen Nozzle Ladder. This famous EAGLE unit increases pumping capacity up to 400%.

SEND FOR OUR NEW BULLETIN NO. 41



EAGLE Single Spiral Screw Washer. Also available in double screw type. Many sizes.

EAGLE IRON WORKS
Des Moines, Iowa



WELDED
ROLLED STEEL CONSTRUCTION for GREATER STRENGTH and SPEED

"WILLIAMS BUCKETS.. ARE SURE EASY ON ROPE"

...writes a veteran crane operator who has been swinging buckets for 10 years. There's a reason! Williams sheave assembly, with sheaves set askew (see illustration), keeps leads straight, reducing friction and fraying. Cable lasts longer. Sheave block is protected against contact with bucket load; open ends guard against clogging and abrasive wear. Williams special Welded Rolled Steel Construction also increases strength and improves balance of bucket. A Williams insures faster work, cleaner dumping, more yardage, and operates for years practically free of costs for maintenance and repairs.

Distributors in all parts of the country.
Write for Free Bulletins *on any of the 11 types of Williams Buckets.*

THE WELLMAN ENGINEERING COMPANY
7014 CENTRAL AVENUE CLEVELAND, OHIO

WILLIAMS *Buckets*
***built by* WELLMAN**

NEW EQUIPMENT means LOWER COST DIGGING!

1500 Rolled Alloy Steel EXCAVATORS HAVE CONCLUSIVELY PROVED THAT P&H'S MODERN DESIGN IS FAR AHEAD — Superior

Why cling to that old shovel? Why rob your profits to pay repair bills? The exclusive rolled alloy steel construction of P&H excavators means more dependability, greater production—and extra strength to resist the wear and tear of year-after-year operation.

Ask also about P&H's new hydraulic control. It's simpler, more positive and as smooth as steam!

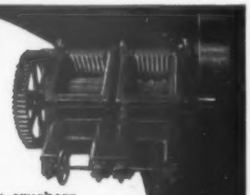
Capacities from 3/8 to 5 cu. yds. Gasoline, Diesel, electric power. Literature available on all models.

General Offices: 4451 W. National Avenue, Milwaukee, Wisconsin.

HARNISCHFEGER CORPORATION

EXCAVATORS · ELECTRIC CRANES · ARC WELDERS · P&H · HOISTS · WELDING ELECTRODES · MOTORS

McLANAHAN EQUIPMENT



for ROCK— SAND—GRAVEL

Single and double roll and jaw crushers, hammer mills, super dry pans, steel log washers and scrubbers, sand drags, revolving and vibrating screens, elevators, conveyors, dryers, jigs, hoists. Complete portable, semi-portable and stationary crushing, screening and washing plants for different capacities of any materials.

McLanahan & Stone Corporation

Established 1835

Hollidaysburg, Pennsylvania

ROUND SQUARE SQUAROUND* HEXAGON PERFORATED PLATE

of every description for maximum productiveness from your vibrating screens.

*Reg. U. S. Pat. Off.

HENDRICK MANUFACTURING CO.

39 Dundaff Street, Carbondale, Pa.

Sales Offices in Principal Cities. Please Consult Telephone Directory

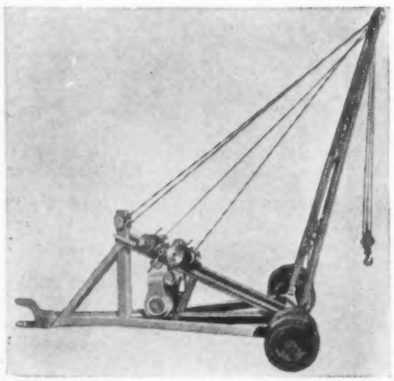
In Hibbing or Pittsburgh

DIAMOND CONVEYOR ROLLS

are a necessary link in steel production

Whether at the iron mines of Minnesota or the mills and factories of Pittsburgh or Saint Louis, DIAMOND conveying equipment daily carries tons upon tons of materials or manufactured products smoothly, quickly, economically and satisfactorily.

DIAMOND conveying systems can be applied to nearly any carrying problem in most any line of business. Ask for information and suggestions.



The PORTA CRANE is the answer to many a daily problem of lifting and moving on the job. Portable. Can be hauled from place to place. Will lift and move, and can even be used as a dragline. Ask for complete details and prices.

DIAMOND is making astonishingly prompt deliveries on conveyors, Porta Cranes, crushers, screens, etc. Write for prices and full information.

DIAMOND IRON WORKS, INC.

ESTABLISHED 1890

AND THE MAHR MANUFACTURING CO. DIVISION

MINNEAPOLIS, MINNESOTA, U. S. A.

MORE WORK at LOWER COST

STEAM
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GASOLINE
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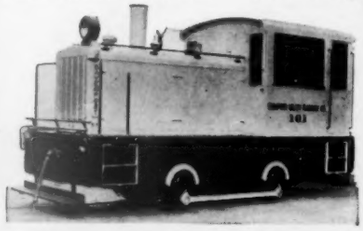
DIESEL
LOCOMOTIVES
MECHANICAL
or
ELECTRIC
DRIVE

—that's what a Davenport Locomotive means to you. Your engineers will approve every modern detail of these outstanding power units. Your operators will enthuse over their flexible, smooth performance and easy handling. Your profit sheet will prove that you have made a good buy. Submit your requirements for free recommendations.

Export Office
BROWN & SITES
50 Church St., New York
Cable Address "BROSITES"

Complete Information is Yours for the Asking



DAVENPORT LOCOMOTIVE WORKS
A DIVISION OF DAVENPORT BESLER CORPORATION, DAVENPORT, IOWA

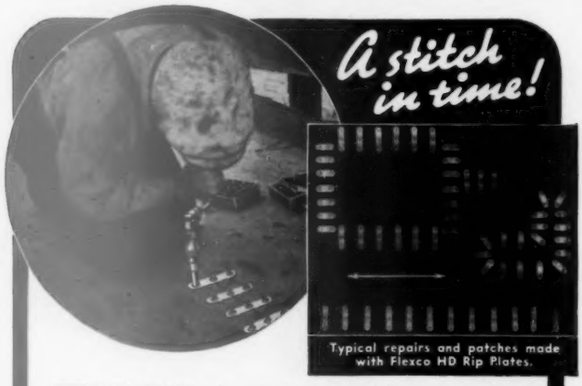
OSGOOD

TYPE 90
FOR HEAVY DUTY WORK

Built to give long, satisfactory service under hard rock conditions.

Write for details as Shovel, Dragline or Crane.

THE OSGOOD COMPANY
MARION, OHIO



Typical repairs and patches made with Flexco HD Rip Plates.

THOUSANDS of men in industrial plants, mines and mills all over the country are doing just what this man is doing. They are cutting costs by repairing conveyor belts with Flexco HD Rip Plates.

WRITE TODAY FOR BULLETIN F-100 that shows how easy it is to repair rips, to strengthen soft spots and to put in patches by using Flexco HD rip plates. The bulletin also shows how to make tight butt joints in both conveyor and elevator belts with Flexco HD Belt Fasteners. These fasteners are made in six sizes. Furnished in special analysis steel for general use and in various alloys to meet special conditions.

Flexco HD Rip Plate

Flexco HD Belt Fastener

FLEXIBLE STEEL LACING CO.
4623 Lexington St., Chicago, Ill.

FLEXCO HD BELT FASTENERS
Sold by supply houses everywhere

FINISH THE JOB
WITH A
BAUGHMAN
LIMESTONE SPREADER

Be sure that your production of agricultural limestone is correctly applied. Baughman spreaders will do it. Even distribution of limestone up to 40 ft. width is assured by the spreading action of a specially-designed revolving disc.

The illustration below shows two 7½ ton Baughman MAMMOTH limestone spreaders at work. Notice how the spread is held down to the ground where it belongs and also the width of the spreads. These two machines have spread thousands of tons of lime and are still going strong.

Baughman limestone spreaders are made in models that can be attached to flat or dump trucks. The new, improved MAMMOTH carrier and spreader comes in seven models ranging from 6 to 18 tons. Each model is a self-contained unit with built-in drives and controls.

Write for our literature

BAUGHMAN MANUFACTURING CO.
Specializing in Spreading Equipment
JERSEYVILLE, ILLINOIS

DEFENSE *Against* WEAR

This photograph shows a revolving packer which trowels the inside face of the bell in a machine producing concrete pipe. Because of the abrasive nature of the concrete, composed of ⅜-inch crushed stone, sharp sand and cement, the trowels wear rapidly unless given a facing of protective metal. This operator now has the trowels cast from mild steel, undersize to allow for a facing of COAST METAL Number 5. In actual tests, this method has outworn chilled cast-iron, laminated hardened tool steel, Swedish steel, and other materials—TWENTY to ONE!

In the same plant, the feeder paddles in the pipe machine are also hard faced the COAST METAL way. By so doing, each set of paddles thus surfaced lasts as long as five complete new installations of ordinary chilled cast-iron paddles.

Now, especially, when equipment is hard to get and must last a long time, COAST METAL will solve many of your problems and save money as well. May we be of service?

COAST METALS Inc. Canton, O.

Uniform Separation

The new model GAYCO Centrifugal air separator makes possible the uniform and increased recovery of cement and other extremely fine materials within a range of 60 to 400 mesh.

- **Greater Capacity**
- **Cleaner Tailings**
- **99% Through 325 Mesh**
- **25% to 30% greater recovery of fines.**
- **Not affected by variation in speed or rate of feed.**

Manufacturers also of "Reliance" Crushers, Screens, Elevators, Conveyors, Bin Gates, Grizzlies. Complete crushing, screening and washing plants for crushed stone, sand and gravel.

UNIVERSAL ROAD MACH'Y CO.

Rubert M. Gay Division 117 Liberty St. New York, N. Y.
Canadian Representative: F. H. Hopkins & Co., Ltd., Montreal

LOW-COST ACCURATE SCREENING

• Screening equipment is of first importance to National Pulverizing Co., Millville, N. J., whose product—silica sand—is accurately graded to seven sizes. Starting 15 years ago with 8 Link-Belt vibrating screens, they have since purchased 7 additional units. As in numerous other installations, Link-Belt vibrating screens have shown the way to accurate separation and lowest operating cost. The whole story of their economy and smooth, trouble-free operation is given in Book No. 1762. Send for a copy today.

LINK-BELT COMPANY 8694
307 N. Michigan Avenue, Chicago

WRITE TODAY! **LINK-BELT Vibrating Screens**

SAUERMAN *Long Range* MACHINES

This picture shows how Sauerman Cableway digs dry and wet gravel and moves material to top of screening plant at total cost of a few cents per cubic yard.

•

(Upper View) A simple Sauerman Power Drag Scraper installation stores and reclaims seasonal surplus of crushed fines at large stone crushing plant.

PROBLEMS of moving gravel, sand, crushed rock, distances of 100 to 1000 ft. or more are solved cheaply with SAUERMAN Scraper or Cableway machines.

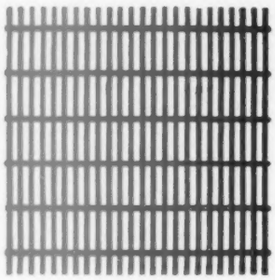
There is a double saving when you use a SAUERMAN machine. You keep down your equipment outlay and your daily operating expense is lower than with any other equipment able to dig and haul an equal yardage. One man handles the entire operation. Capacities range from 10 to 1000 tons per hour.

SAUERMAN engineers will be glad to study your excavating and stockpiling problems. Their advice may help you to increase your profits. Investigation costs you nothing.

Write for Catalog.

SAUERMAN BROS., Inc.

434 S. Clinton St. Chicago, Ill., U. S. A.



Rolled Slot

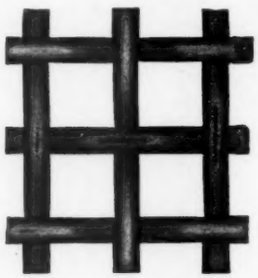
ALLOY No. 2

A super wearing Steel developed to resist the abrasion and vibration of modern screening demands.

"CLEVELAND" SCREENS

A wire cloth of guaranteed accuracy backed by fine workmanship and an effort to satisfy.

Available in Square Mesh and Rolled Slot. A trial will convince you of the superiority.



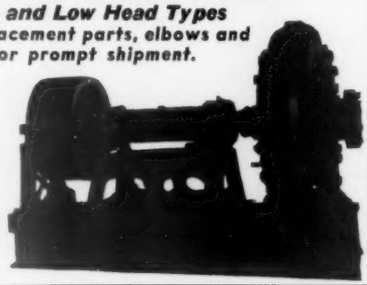
2 Mesh .162 Ga.

THE CLEVELAND WIRE CLOTH & MFG. COMPANY
574 E. 78th St. CLEVELAND, OHIO

LIGHTNING

Sand and Gravel Pumps

Heavy-Duty (Ball-Bearing) and Low Head Types
Complete stock of replacement parts, elbows and fittings carried for prompt shipment.



Also clear water pumps for general service, modern design, lowest cost. High efficiency means low operating costs. Replacement parts always fit. We build abrasive material, handling pumps from 10" down to 3" in size.

KANSAS CITY HAY PRESS CO.
KANSAS CITY, MO.

Lewistown Foundry Products
ARE
Performance-Tested

BUCKET ELEVATORS
REVOLVING SCREENS
CRUSHERS DRY PANS

Lewistown Foundry & Machine Co.
Lewistown, Pa.

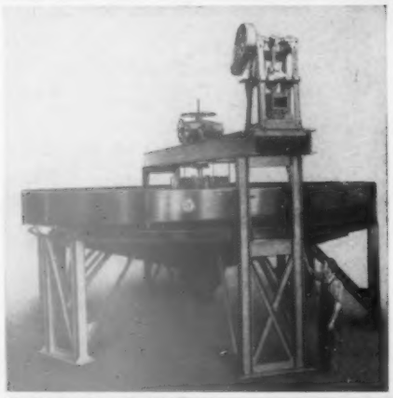
ROTARY KILNS
GRINDING MACHINERY
for cement, lime, ores, etc.

F. L. SMIDTH & CO.
60 East 42nd Street New York, N. Y.

COMPLETE CONVEYOR SYSTEMS ENGINEERED TO YOUR NEEDS Sprout-Waldron engineers will want to know the nature of material to be moved, the distance involved, the capacity required. Their job is to give you most efficient performance at lowest cost. Talk to a Sprout-Waldron sales engineer. There's no obligation, and he may be able to save you money. *Literature on request.*

SPROUT, WALDRON & CO. INC.
137 SHERMAN ST. MUNCY, PA.

ELEVATORS, CONVEYORS, POWER TRANSMISSION EQUIPMENT



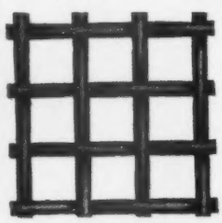
DENVER HYDRO-CLASSIFIER

The Denver Hydro-Classifier is designed for fine sizing and de-sliming problems where it is essential to reduce materials to sizes minus 200 mesh to 10 microns. Enclosed integral lift vertical worm gear drive makes it easy to raise rakes. The spiral rakes convey material to center cone in one revolution. Ask us how these machines will save you money.

Denver Equipment Co.
1400 Seventeenth Street
Denver, Colorado

New York, N. Y., 50 Church St. Salt Lake, Utah, McIntyre Bldg. Chicago, Ill., 1005, 69 W. Wash. Toronto, Ont., 45 Richmond St. Mexico, D. F., Boker Building

BUSY DAYS AHEAD!



There'll be little time for breakdowns and delays in your aggregate production.

Make sure **now** that you are equipped with woven wire screen that stands the "gaff" under the toughest runs.

TWIN CITY SCREEN
It's Abrasion Resistant—Accurate—
Longer Wearing!

ORDER YOUR "TWIN CITY" SCREEN TODAY

TWIN CITY IRON & WIRE CO.
31 W. WATER ST. ST. PAUL, MINN.
Write for Catalog No. 39

Bucket Elevators: Open, Closed, Continuous 5"x32', 6"x32', 12"x35', 14"x32', 14"x50', 16"x60', 20"x40', 24"x50', etc.
Chain, Buckets, Belt, Steel Casings, Gears, Sprockets, Bearings, Take-Ups, etc.
New Malleable type AA buckets, 24", 20", 14".
150 Cast & Steel Transmission Pulleys.

Belt Conveyors:
50 Sets of Head and Tail Pulley Assemblies.
400 Feet of 36" wide 6-ply Rubber Belt.

Crushers:
Jaw: 10x4-A, 10x7-A, 10x7-B, 15x9-A, 18x12, 20x10 and 36x24-A.
8" Traylor #25 & #37 Kennedy Gyratories.
24" Pennsylvania "Trojan" Hammer Mill.
Kent Heavy Duty Grinding Mill.
30"x28" Robins Corrugated Rolls.
24"x24" Standard Single-Roll Type.
54"x20" Garfield Single-Roll Type.
42"x20" Traylor Roll.

Screens: Vibrating types.
3x5' 1-deck Deister Multirap.
3x5' & 4x5' Tyler Hummer Electries.
3x6' 1-deck & 2-deck Deister Leahys.
4x6' 2-deck Deister Leahys.
3x5' & 4x5' "Toncap" for Hummer Screens.
1½-KW Tyler 15-cycle Motor Generator.

Miscellaneous:
¾-yd. Byers Shovel, skimmer, backhoe.
½, ¾, 1¼ & 1½ yd. Clamshell Buckets.
Insley Bottom Dump Concrete Buckets.
No. 7 Piledriving & No. 2 Sheeting Hammers.
2,000 of 5⅛" Universal Form Clamps.
2-drum Thomas 50 hp. Electric Hoist.
Krom Dial Scales for Asphalt Work.
800-hp. Patterson Hot Water Feed Heater.
Hoskins Electric Furnace, 3-60-110/220.
20 Assorted Centrifugal Water Pumps.

Railway Equipment:
36"-g. 4 & 8-ton Gasoline Locomotives.
36"-g. 4-yd. Dump Cars, hinged bodies.
36"—V-Dump Cars, 2 and 3-yards.
5—24"-g. Koppel V-dump Cars, ½-yd.
5—24"-g. Easton V-dump Cars, 1¼-yd.
6—24"-g. Atlas End Dump Cars, ½-yd.
24"-g. Portable Track, Switches, 1500'.
30"-g. Mercury Battery Locomotives.

G. A. UNVERZAGT, 15 Park Row, New York City

SHOVELS—CRANES

1—Lorain-79 Diesel Shovel 1½ yd. new November 1940.
1—P&H 600-A Gas Shovel 1-yd. also 50' crane boom & dragline Fairlead.
1—Keystone Model 18-A Gas Backhoe & Skimmer, 1¼ yd. new 1938.
1—Lorain-40 Gas Crawler Shovel ¾ yd. Chain Crowd new 1939.
1—Northwest Model-18 Truck-Crane 30' Bm. ½ yd. CS Bucket, 4-sp. Mack, pneumatic tires.
4—Euclids 9 cu. yds. cap. Bottom dump, pneumatic tires, Airbrakes, 100 HP. Waukesha Gas Motors.
1—Northwest No. 4 Backhoe attachment.

GREY STEEL PRODUCTS CO., INC.
74 Central Ave. Glen Rock, N. J.
Tel. Ridgewood 6-2275

SHOVEL ATTACHMENTS FOR NORTHWEST

1¼ dipper 21'-6" welded boom, 17' sticks, serial 5002, with third drum, for Model 5 or 6, excellent condition..... $2,000.00
1¼ dipper, 24' riveted boom, 17'-6" sticks (without third drum), for Model 5 or 6, fair condition..... 1,000.00
1¼ dipper 26' riveted boom, 18'-6" sticks, standard crowd, Serial #1213B for Model 105, 104, or M, Operating condition 800.00
¾ dipper, 18' riveted boom, 15' stick, with third drum, for Model 20 or 25, rebuilt 1,000.00
½ dipper, 15' welded boom, 12'-6" stick, with third drum, for Model 15 or 18, like new 800.00

J. E. INGRAM EQUIP. CO.
1146 W. Laurel San Antonio, Tex.

CRUSHERS—ELEVATORS—SCREENS
SAND WASHERS—PUMPS—CONVEYORS

1—4"x12" WHEELING No. 2 Jaw Crusher.
1—BRAND NEW Jaw Crusher 9"x15".
1—8"x15" CLIMAX No. 1½ Jaw Crusher.
1—9"x16" CLIMAX No. 2 Jaw Crusher.
3—12"x26" CHAMPION No. 6 Jaw Crusher.
1—36"x24" TRAYLOR deep frame Jaw Crusher.
1—36"x30" FAIREL deep frame Jaw Crusher.
1—10"x16" NEW HOLLAND 4 roll crushers.
2—Sets STURTEVANT Balanced crushing rolls 21"x10½" and 36"x16".
2—M-20 QUAKER CITY Hammer Mills.
1—No. 1 STURTEVANT Open Door Rotary.
1—24" wide LINK-BELT Apron Feeder.

Cranes, Shovels, Hoists, Motors, etc. Sales & Service on UNIVERSAL CRUSHER CO. products.

JOHNSON AND HOEHLER, INC.
LANSDOWNE, PENNA.

FOR SALE

1—Universal Type "B" ¾ yd. Gas Shovel ¾ yd. Swing—On Cats—Extra Parts.
1—Fairbanks Steel Frame Chain Bucket Elevator 20 ft. long, Buckets 24"x14" With Drive—No Power.
1—No. 5 Traylor Gyratory Crusher, suspended headgears new.
1—No. 4 Gates Style "K" Straight Drive Gyratory Crusher.
1—30" Robins Conveyor Tripper with Head and Tail Assembly.

HELLER STONE COMPANY
RR #1 Bluffton, Ind.

SURPLUS EQUIPMENT

ELECTRICAL EQUIPMENT
3—300 K.W., 600 Volt, G.E. Rotary Converter.
1—300 K.W., 600 Volt, G.E. Switchgear.
3—300/450 KVA, G.E. Transformers.

HOISTS
1—60 H.P. PTE, D.D. Sauerman.
1—37 H.P. 48x42, S.D. National.
3—35 H.P. National D.D. Tuggers.
2—45 H.P. Ingersoll-Rand Tuggers, D.D.

JIGS, ORE
1—2 Cell, 42" Bendelari.
1—2 Cell, 42x42 Nordberg-Wood.
7—3 Cell, 42" Bendelaries.
1—4 Cell, 42x96 Allis-Chalmers Conset.

PUMPS
4—4" Dorreo Diaphragm Suction.
3—Cameron Steam, 206 to 248 G.P.M.

TRUCKS, Euclid Diesel Rear Dump
2—10 Yd. F.D., Standard 150 H.P.
3—10 Yd. F.D., Super Charged.
3—10 Yd. 2 F.D., Super Charged.

WAGONS, CRAWLER
1—10 Yd. Patterson, Side Dump.
4—16 Yd. Athey, 2-Way Side Dump.

BALL MILL: Eimco 5x4.
BOILER: Kewanee Steam Heating 2300 Sq. Ft.
BUCKET ELEVATORS: Steel 320 Cap. 27'6' Centers.
CLASSIFIER: 6x21, Model "C" Dorr Duplex.
CRANE: 20 Ton McMyler Loco. Type.
CRUSHER: 2' Symons Cone, Coarse Standard Head.
GOLD MACHINE: Ainley 4 Bowl.
SCALE, TRACK: 28' Rail 100 Ton Cap.
SCREEN: 5x8 Trommel Revolving.
SHOVELS: 2—4 Yd. #4160 Marions, Elec.
SPREADER PLOW: Standard Ga. Bucyrus Class 50.
THICKENERS: 2—10 Ft. Eimco.
TRACKSHIFTER: Model "N" Standard Ga.
TRACTORS: 5—RD8 Caterpillars.
WATER TANK: Steel 10,000 Gal.

BUTLER BROTHERS
PRODUCERS OF IRON ORE
137 East 8th St. St. Paul, Minn.

NEW AND USED EQUIPMENT FOR IMMEDIATE SHIPMENT
Subject to prior sale

NEW—32" Cage Mill, 3 to 4" feed rock or gravel, good for maximum 50% crushing, 40 to 60 tons per hour.
NEW—Steel Truck and Wheels, equipped with new pneumatic tires, tongue for tractor hitch, 10-ton capacity, for mounting 40x20" rolls or 15"x36" crusher.
USED—9"x16" RELIANCE Jaw Crusher, good condition.
USED—Model 101 Type K DAY Limestone Pulverizer, 2 to 3 tons capacity.
USED—GRUENDLER No. 2 Monster Limestone Pulverizer, 4 to 5 tons per hour.
USED—No. 7 MITTS & Merrell Wood Hog, plain bearing, 14"x14" hopper opening, capacity 5-tons per hour.
USED—24"x18" LIPPMAN Portable limestone Pulverizer, with 14' elevator, in excellent condition.
USED—XXB GRUENDLER 24"x18" welded steel Limestone Pulverizer, 6 to 7 tons per hour capacity.
USED—SCHUTTE Type F, Model L, Hammermill with or without fan for sawdust, oyster shells, etc., in excellent condition.
USED—GRUENDLER light type, 3'x8' single deck Vibrating Screen.
USED—GRUENDLER 30"x12" sawdust, oyster shell or fertilizer Grinder, slow speed.
USED—50-16 SUPREME (GRUENDLER) Hammermill for sawdust, oyster shells, bones or fertilizer.
One (1) Factory re-conditioned LeRoi RA2P 65-HP gasoline power unit.

STATE FULLY YOUR REQUIREMENTS

GRUENDLER CRUSHER & PULVERIZER COMPANY
2915-2917 North Market Street
St. Louis, Missouri

REBUILT TRUCK MIXERS

For Rent or Sale
All Sizes
With or Without Trucks
27-E MULTI-FOOTE PAVER
Road Forms—Finishers

THE JAEGER-LEMBO MACHINE Corp.
Corona, N. Y.
Phone: NEwtown 9-7777

The same diamond is bought and sold many times; yet it is never regarded as "second hand" because it continues to perform its function of being beautiful, just as it did when new. Likewise E.C.A. equipment is not regarded as "second hand"; because it is REBUILT and RE-GUARANTEED to properly perform its functions. Yet it costs far less than new equipment.

AIR COMPRESSORS:

30—Portable gasoline driven air compressors all makes—sizes 310', 260', 220', 160', 110'.

BINS:

8—1—150-ton Blaw-Knox, 1—118-ton Blaw-Knox, 1—117-ton Blaw-Knox, 1—72-ton Blaw-Knox, 1—51-ton Blaw-Knox, 1—35-ton Blaw-Knox, 2—30-ton Johnson offset bins all with or without weigh-batchers, and are 2 comp. bins.

CABLEWAYS:

1—Lidgerwood 15 ton cap. cableway, 2300' span, with Lidgerwood 12¼x15 steam hoist, with or without steel towers.

CRANES, DRAGLINES AND SHOVELS:

1—Link-Belt K-55, Serial No. 1698, 70' boom, 2 yd. bucket, also have 2 yd. shovel attachment.
1—Link-Belt K-48, Serial No. 1728 with 60' boom, 2 yd.
1—Northwest Model 5, Serial No. 3572 with 50' boom, 1½ yd.; also pull shovel 1¼ yd. and
3—Northwest Model 4, Serial Nos. 3441, 3445, 3493 with 40' boom 1 yd.; also 1-yd. pull shovel.
1—Northwest Model 104, Serial No. 2079, 45' boom, 1¼ yd. bucket; with 1 yd. shovel attachment.
1—Link-Belt, Model K-42, Serial No. 1265, 45' boom, 1¼ yd. bucket, also 1 yd. trench hoe attachment or 1¼ yd. shovel front.
2—Northwest Model 105, Serial Nos. 2556, 1645, 40' boom, 1 yd. bucket with one shovel attachment.
3—Osgood Heavy Duty, Serial Nos. 2069, 2087 and 2403, 40' boom, 1 yd. bucket and 1 yd. shovel attachment.
2—Erie Gas-Air, Serial Nos. 4365, 9758 with 45' boom and 1¼ yd. shovel attachment.
1—Thew, ¾ yd. Gasoline shovel with ¾ yd. shovel front and 40' crane boom. Serial No. 2801.
1—Koehring Model 301, Serial No. 544, 40' boom, ¾ yd. bucket.
1—Northwest No. 2 crane, new 1937 with 40' boom.
1—P&H Model 206, Serial No. 1901, ¾ yd. 40' boom.
1—Byers Bearcat Model No. 128, Serial No. 4119, ½ yd. cap. 30 ft. boom.
1—Byers Bearcat Model 27, Serial No. 5289, 36' boom, ½ cl. sw. ½ yd. bucket.
1—Erie Steam Crane and Shovel with 40' crane boom, with or without ¾ yd. shovel front.

PNEUMATIC TOOLS:

36—Rock Drills, mounting, wagon, column or tripod.
53—Jackhammers, various makes and sizes.

EQUIPMENT CORPORATION of AMERICA

1160 So. Washtenaw Av., Chicago, Ill.
1513 Race St. Philadelphia, Pa.
30 Church St., Dept. PQ. New York, N. Y.
P.O. Box 933, Dept. PQ. Pittsburgh, Pa.

FOR SALE

Agricultural Hydrating Lime Plant Complete—Buildings, Kiln and Quarry.

PEAPACK LIME COMPANY, Inc.
Gladstone, New Jersey

Consolidated Can Help You Overcome Today's Conditions

GYRATORY CRUSHERS

1—16" Telsmith.
1—18" Traylor Bulldog type.
1—20" Superior McCully.
1—27" Gates, with 100 H.P. A.C. motor.
1—#410-TZ Traylor, 10" feed, can be set to ½".
1—2' Symons Cone Crusher, fine bowl.
3—Kennedy #19, #25, #49.
2—Telsmith #2-H and #3-F.
1—#40 Telsmith, 5" feed, ⅞" discharge; also #40 with 40 H.P. A.C. motor.

JAW CRUSHERS

48"x42" NERMCO; 24"x36" Allis-Chalmers; 9"x36" Wheeling; 15"x36" Universal; 18"x24" Blake, 18"x24" Pioneer; 10"x36" Farrel, and smaller sizes.

2—6' x 12' ROD MILLS

Hardinge straight side Rod Mills, iron lined, Falk herringbone steel gears, Falk enclosed gear drive units, charge of rods with each mill. Arranged for peripheral or trunnion discharge. In excellent condition and for immediate shipment.

ROTARY KILNS

5'x24', 7'x40', 6'x60', 7'6"x125'.

ROTARY DRYERS, Direct Heat

Ruggles-Coles, double shell: 5'x26', 5'x30', 6'x35', 5'6"x60'; 80"x45'.
Single Shell: 5'x30', 6x40, 6x50, 6x60, 7x60.

RAYMOND PULVERIZERS

2—4 roll HIGH SIDE, COMPLETE. Located Toledo. Must be removed by Nov. 10th. Priced accordingly.
2—2 roll HIGH SIDE, COMPLETE. Located Mobile, Alabama.
Nos. 0000, 00, 1 and 3, beater type. Also Nos. 55, 60, 90 "Imp" type.

VIBRATING SCREENS

1—4'x14' SYMONS, DOUBLE DECK.
2—4'x7' Leahy, 2 deck, motor driven.
4—3'x5' Tyler Hummer, 2 deck, No. 31, enclosed.
2—4'x7' Jeffrey-Traylor, Type FB-4, 2 deck.
1—3'x7' Simplicity, 2 deck, motor driven.
1—3'x8' 3'x10' Niagara, 3 deck.
1—4'x8' Huron, 1 deck, V-belt drive.

LIME HYDRATORS

Weber Sr. type, made by Arnold & Weigel with No. 1 Raymond Bros. Lime Separator; also Kritzer.
One Complete Hydrated Lime Plant.

BALL, ROD AND TUBE MILLS

Ball Mills: 6x6, 6x8.
Rod Mills: 4'x8', 6x12 Hardinge, straight side.
Tube Mills: 2—5x20' Bonnot Co., silex lined.
1—5x22' Bonnot Co., silex lined.
6'x23', 2—6'6x20' Smidth, silex lined.
5'x22' Allis-Chalmers, 5'x35' Vulcan, both iron lined.

HARDINGE CONICAL MILLS

Silex lined: 4'6x16", 5'x22", 6'x22", 6'x48", 8'x18", 8'x30".
Iron lined: 3'x24", with classifier; 4'6x16", 5'x22", 6'x22", 8'x18", 8'x30", 8'x36" with motor; 8'x48" with air classifier; 8'x48".

COAL PULVERIZERS

2—Erie City "Unitype" Size A, also Size C. with 60 H.P. motor.
4—4'x8' Kennedy; also 3'x6'.
3—Foster Wheeler Size J, with 150 H.P. motors.
2—Riley "Arrow" Size G.
2—#55 Raymond "Imp" with 60 H.P. motors.

CONSOLIDATED PRODUCTS CO. INC., 17-19 Park Row, NEW YORK, N. Y.

Our Shops and Yard at Newark, N. J., cover eight acres.

COMPLETE STONE CRUSHING
or
SAND and GRAVEL PROCESSING SERVICES
available on tonnage basis

We will install NEW, MODERN portable or semi-portable plant in any practical location. Capacities 100 to 150 tons of stone per hour or 150 to 200 tons of sand and gravel per hour.

Estimates Furnished Without Obligation

Address
CONTRACTORS SERVICE CORP. Box 579, Harrisburg, Pa.

NEED DUMP CARS?

Immediate Delivery:
3, 30-yd. Clark, d/t doors
10, 30-yd. Western
8, 24-yd. Koppel
15, 20-yd. Koppel
3, 20-yd. Western
24, 16-yd. Western
15, 16-yd. Kilbourne & Jacobs
Illustrated specifications available— **Other Types of Cars Too.**
Also Locomotives, Cranes, Shovels, Etc.

IRON & STEEL PRODUCTS, Inc.
13490 S. Brainard Ave., Chicago, Illinois
"ANYTHING containing IRON or STEEL"

IMMEDIATE SHIPMENT

1—8" AMSCO GRAVEL PUMP, POWERED BY 160 H.P. BUDA DIESEL ENGINE, MODEL 6-L-D.

DELANEY EQUIPMENT CO.
15 E. Seven Mile Rd. Detroit, Mich.

DEPENDABLE USED MACHINES

Heil 6 yd. scraper, new; 25% off.
A-W 8 yd. scraper, used 3 months.
Allis-Chalmers tractor shovel; late model.
Universal ⅝ yd. shovel, rebuilt.
P&H ¾ yd. shovel; low price.
Pioneer No. 22 crushing & screening plant.
B-G 18x25 portable conveyor; elec.

TRACTOR & EQUIPMENT CO.
3515 West 51st St. Chicago, Ill.

Late "37" Lorain, ⅝ yard shovel, crane boom with 10' jib ext, crane or dragline, first class.
Byers "62" chain crowd shovel attachment, ½ yd. fit late model Byers various sizes. Used very little.
Buda D4 6x8 Diesel rebuilt $1200.
20x36" new type Universal jaw, double rolls. 2 power plants shaker screen, conv. & 21 yd. bin.
Built in units, on rubber. Ready complete.

GEORGE C. KENNEY MACHINERY CO.
2136 Jefferson St. Kansas City, Mo.

"The ad ran once—we sold the machinery. Please cancel future insertions."

Quoted from a letter written by a quarry operator who advertised equipment for sale in this Broadcast Section of Pit and Quarry.

If you have something you want to sell, advertise it. If you want to sell it quickly, advertise it in Pit and Quarry.

Write for a rate card to-day, or, better still, send an advertisement and learn for yourself how well and quickly this section can serve you.

FOR SALE

Derricks—Guy steel & wood 34-40′ booms.
Hoist—Clyde 2 drum & slewer, 35 hp.
Pile Outfit—Steel leads, 2,500# hammer caps, etc.
Air Compressor—Gardner 2—4½x4½, 15 hp.
Mixer—CMC 10S, carts and barrows.
Boiler—20 hp. horizontal on steel skids.
Asphalt Kettle, torch & kerosene tank.
Sullivan Breaker & drill with tools.
Jacks—Track & geared, 10-25 ton.
Hoisting Blocks, Air Tamper, suct. hose 5″x15′.
Turn Buckles — 24-30″ drift, 1¼ x 1½″ screws.

R. E. LUNDGREN
405—51st St. Des Moines, Iowa

USED EQUIPMENT FOR SALE

2—Chrysler Royal 8 marine engines, left and right hand with 3:71 reduction gear.
1—75 HP Lathrop 6 cylinder marine engine with Joes reverse gear.
1—10″ Morris dredge pump.
1—160 cu. ft. Davey compressor with V belts and motor sheaves.
1—Chicago Pneumatic compressor size 7½x6.
1—No. 5 Austin crusher.
1—3″ Self priming Novo water pump.
1—7S Koehring Dandie mixer two wheel pneumatic tired.
1—Ingersoll-Rand Drill steel sharpener with dies and oil furnace.

FRANKFORT EQUIPMENT COMPANY
414 Ann St. Frankfort, Ky.

FOR SALE
Crushing Plant

1—48x60 Jaw Crusher.
4—12″ Gyratory Crushers.
2—4″ Gyratory Crushers.
1—60″ Revolving Screen.
2—36″ Revolving Screens.
2—42″ Belt Conveyors.
1—Bucket Elevator.
1—175 H.P. Motor (For Jaw Crushers)
1—Lot Pulleys, Sheaves, Motors, Etc.
Above items to be sold as one lot.

1—360 H.P. F-M Diesel Engine & Gen.
1—120 H.P. F-M Diesel Engine & Gen.
1—Asphalt Mixing Plant.
1—Concrete Mixing Plant.
1—7″ Newhouse Crusher 60 H.P. Motor.
1—24″x20″ Jeffrey Pulverizer.
3—5 Ton Plymouth Gas Loco., 36″ Ga.
2—Fuller Kenyon Cement Pumps.

JOHNSON MACHINERY CO.
310 Keystone Ave. River Forest, Ill.
Phone Forest 4402

FOR SALE BARGAINS

Shovel attachment for Koehring 501 machine, 1¼ yard.
P&H crawler gas shovel, ¾ yard, with 40′ boom.
Northwest crawler gas crane, 1 yard.
Many other items available at low prices.

THE ACME EQUIPMENT COMPANY
14057 Schaefer Highway Detroit, Michigan

FOR SALE

One Woodford Engineering Company quarry haulage system, complete with generators, switches and controls, ten quarry cars, ten yards capacity—now operating and available for inspection.

BASIC REFRACTORIES INCORPORATED
Maple Grove, Ohio

FOR SALE

Lidgerwood Electric Single Drum Hoist 22 HP., 3 Ph., 60 Cy., 220 V.
Also Cars, Buckets, Etc.

THE INDUSTRIAL EQUIPMENT CORP.
P.O. Box 1647, Pittsburgh, Pa.
Warehouse: Carnegie, Pa.

FOR SALE

20 Dempster Dumpsters, 2 Yard Models, mounted on White Trucks, 805 Model, Cab over Engine. 5 buckets to each complete unit. All in A-1 condition.

GEROSA HAULAGE & WAREHOUSE CORP.
769-785 East 138th St., New York, N. Y.

CONCRETE EQUIPMENT

Ready-Mix Blaw-Knox concrete plant, complete, large size, splendid condition, unusual opportunity, specifications furnished.
Blaw-Knox complete central mixing plant.
Heitzel bin, 225 ton, 4 compts., weigh batcher.
Blaw-Knox complete ready mix concrete plant.
Butler 100 yd. 3 compt. bin, weigh batcher.
Beaumont 42 yd. two compt. bin.
200 ton rock storage bin, steel, heavy construction.
Fuller Kinyon bulk cement unloader, portable.
Fuller C40 rotary air compressor, electric.
Smith 1 yd. tilting mixer, electric.
Ransome 28-S 1 yd. Stationary mixer, elec.
1—Haiss bucket loader, caterpillar.
Barber-Greene Model 42 loader, cats.
Barber-Greene Model 62 loader, cats.

BUCKETS—STONE SKIPS

2—Steel stone skips, ½ to 3 yds.
1½ yd. heavy duty Blaw-Knox digging bucket.
1½ yd. Hayward rehandling clamshell.
1¼ yd. heavy duty Blaw-Knox digging clamshell.
1 yd. Hayward clamshell, rehandling.
¾ yd. Haiss rehandling, clamshell.
1 yd. Hayward orange peel, 4 leaf.
¾ yd. Hayward orange peel, 3 leaf.

SHOVELS—CRANES

Marion Model 125 Elec. Shovel, 3¼ yds.
2—Marion Diesel shovels, 1¾ yd. cap.
No. 50-B Bucyrus-Erie electric shovel, 2 yds.
37-B Bucyrus-Erie gas shovel-crane.
Northwest 1½ yd. gas crane, 60′ boom.
Northwest 1 yd. comb. shovel-crane, gas.
Lima Model 101 comb. shovel-crane, 1¼ yds.
Marion Steam Shovel, 1¾ yd. capacity.
Ind. Brownhoist loco. crane, electric, 20 tons.
Ind. Brownhoist loco. crane, 25 tons, steam.

TRACTORS

RD-4 Caterpillar, with bulldozer.
D-5 Caterpillar, with bulldozer.

LOCOMOTIVES—CARS

2—Vulcan 6 ton, gas, 36″ gauge.
2—Whitcomb 4½ ton, gas, standard gauge.
8—3 yd. V type 36″ ga. side dump cars.

CRUSHERS—PLANT

Gyratory crushers: K.V.S. 30, 37-S, 49; Telsmith 32, 8A, 8B; Traylor 8″; McCully 13″, 8″, 6″.
Jaw: 6x12, 9x16, 10x20, 12x26, 13x30, 15x30, 16x32, 36x48, 48x60.
Symons 4′ cone Crusher, complete.

RICHARD P. WALSH CO.
30 Church St. New York, N. Y.

FOR SALE

1—265 HP, 4 cyl. Ball-Muncie Diesel Engine.
1—225 HP 3/60/440 IDEAL Motor.
1—100 KW 250 V. DC NORTHERN Generator.
1—238 HP-18″x19″ McEWEN Steam Engine.
1—75 HP SKINNER Engine.
1—¾ Yard Material Bucket.
1—1¼ Yd. BROWNHOIST Bucket, like new.
1—Barber-Greene Bucket Loader.
1—⅜ Yd. Orton Crawler Crane & Bucket.
1—50-B Bucyrus-Erie Steam Crane—60′ Boom.

PATTERSON EQUIPMENT COMPANY
1468 West 9th St. Cleveland, Ohio

FOR SALE
Cranes—Draglines—Shovels

5—Northwest—P&H—Koehring and Byers from ½ to 1½ yd. buckets.
10—Clamshell and Dragline from ½ to 1½ yd.
Also compressors—pumps—mixers—derricks, etc., etc.

RENNOLDS EQUIPMENT COMPANY
13913 So. Halsted St. Chicago, Ill.

Single Roll Crushers: Ocala 22x30″, Penna. 24x24″.
GyratoryCrushers: Traylor12x40″,30x30″and20″TYRe-duction. Superior10″,Kennedy19,25S&37. Allis6&9.
2′ Symons Cone—3x8′ Jigger 3-deck Vib. Screen.
JawCrushers: 8x36″,15x36″Univ.,18x36″Cedar Rapids.
10x30″ Champion roller bearing, like new.
Two—6x12′ Ball Mills, silex lined, balls & drive.
Barber-Greene Loaders: 24, 25, 42, 62 & 82A.
1 yd. Sauerman Cableway, 55 HP, 2-speed.
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Lansdowne, Del. Co., Penna.

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Pumps—Crushers—Pulverizers—Etc.

RUBBER HOSE

FOR

AIR—WATER—STEAM—ETC.

Partial Stock List

NEW AND HEAVY DUTY

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Quantity	Width	Ply	Top Cover	Bottom Cover	Type
500 Ft.	48"	8	1/8"	1/16"	Conveyor
505 Ft.	36"	6	1/8"	1/16"	Conveyor
856 Ft.	30"	6	1/8"	1/16"	Conveyor
520 Ft.	30"	5	1/8"	1/16"	Conveyor
180 Ft.	24"	6	1/16"	1/16"	Elevator
2305 Ft.	24"	5	1/8"	1/32"	Conveyor
1298 Ft.	24"	4	1/8"	1/32"	Conveyor
250 Ft.	22"	8	1/16"	1/16"	Elevator
1874 Ft.	20"	5	1/8"	1/32"	Conveyor
520 Ft.	20"	4	1/8"	1/32"	Conveyor
506 Ft.	18"	6	1/16"	1/16"	Elevator
1765 Ft.	18"	4	1/8"	1/32"	Conveyor
285 Ft.	16"	6	1/16"	1/16"	Elevator
1450 Ft.	16"	4	1/8"	1/32"	Conveyor
516 Ft.	14"	6	1/16"	1/16"	Elevator
509 Ft.	14"	4	1/16"	1/32"	Conveyor
420 Ft.	12"	6	1/16"	1/16"	Elevator
385 Ft.	12"	4	1/16"	1/32"	Conveyor

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ELECTRIC: 478, 676, 807, 1302, 1722 & 2850 Ft.
DIESEL: 103, 315, 420, 603, 807 & 1000 Ft.
PORTABLE GAS: 110, 160, 220, 310, 540 & 1300 Ft.
STEAM: 49, 310, 528, 1300 & 2200 Ft.

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50 Skips and Battleship Tyne, 2 to 6 Yds.
5 Owen & Bucyrus Rock Grabs.
CLAMSHELL: ½, ¾, 1, 1½ & 2 Yds.
ORANGE PEEL: ¾, 1, 1½, 2 & 3 Yds.
DRAGLINE: ⅜, ½, 1, 1½ & 2 Yds. Cap.

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12 Ton NORTHWEST 50 Ft. Boom Gas.
12 Ton KOEHRING 45 Ft. Boom Gas.
16 Ton Speedcrane, Gas, 50 Ft. Boom.
25 Ton BROWNING & 30 Ton AMERICAN Locomotive.
25 Ton LINK BELT K-48 Electric, 70 Ft. Boom.
2½ Yd. Lorain Model 95, Diesel Dragline.

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½ Yd. P. & H. Gas & ⅜ Yd. Insley Gas.
¾ Yd. KOEHRING Gasoline.
¾ Yd., 1¼ Yd., 2 Yd., 4 Yd. & 8 Yd. MARION Electrics.
1 Yd. NORTHWEST Gas & 7/8B2 Steamer.
1¼ Yd. BUCYRUS 41B Steamer.
1½ Yd. Lima 750 Diesel.
1½ Yd. KOEHRING 601—Gas.

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46—KOPPEL 1½ Yd., 24 & 30 In. Ga., V Shaped.
15—2 Yd., 3 Yd., 4 Yd. 36 In. Ga.
20—Std. Ga. 12 Yd., 16 Yd., 20 Yd. & 30 Yd. Cap.

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6x8 Continuous Pebble Mill.
5x5 Batch Mill.
5'x22" HARDINGE CONICAL Dry Ball Mill.
6'x22" HARDINGE CONICAL Pebble Mill.
4x8, 8x6, & 10x9 Straight Ball Mills.
8'x22" HARDINGE CONICAL Ball or Pebble Mill.
4x16, 5x18, 5x22, & 6x22 Tube Mills.
3½x8 & 5x7 Air Swept Tube Mills.
2x4½, 5x12 and 6x12 ROD MILLS.
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5½x20 Smidth Tube Mill Mang. Lining.
5½x18 P & M Tube Mill Silex.

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RAYMOND Imp Mills No. 4, 32 & 55.
GRUENDLER XXR Mill & Jay Bee No. 3 & 4.
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14 ft., 8 ft. and 12 ft. Separators

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36x60 Fairmont Single Roll.
36x20 Diamond Double Roll.
24x24 & 36x16 & 36x20 Diamond Double Roll.

JAW CRUSHERS

10x8, 13x7½, 14x7, 15x9, 15x10, 16x9, 16x12, 16x10, 18x11, 20x8, 20x6, 20x10, 20x12, 20x11, 26x12, 30x15, 30x13, 36x30, 36x18, 36x14, 36x15, 36x9, 36x6, 38x18, 36x10, 36x24, 42x9, 48x36, 60x42, 84x66, 36x16, 9x36.
30x10 Gruendler Roller Bearing.

CONE & GYRATORY CRUSHERS

18 in., 24 in., 30 in., 36 in. and 48 in. Symons Disc.
21K & 18N Allis Chalmers.
4—10 TZ Traylor 4 Ft. Gyratory.
4—Nos. 5, 3 & 6 Austin Gyratory.
2—Traylor T-12 Bulldog Gyratory.
8 in. Traylor T. Gyratory, Telsmith No. 9.
17 Gates K—Nos. 3, 4, 5, 6, 7½, 8 & 9½.
10 Inch Austin Model 105.
6, 10 & 13 Inch Superior McCullys.
KENNEDY: Nos. 19, 25, 27, 39 & 49.
16" Traylor.
7 Ft., 5 Ft. and 3 Ft. Symons Cone.

DRILLS

4—SANDERSONS 14 & LOOMIS 44.
7—Ingersoll-Rand Wagon Drills, FB & M2.
29T ARMSTRONG Well Drill.

HOISTING ENGINES

7 Gasoline 15, 40, 60 & 100 H.P.
17 Steam 7x10, 8½x10 and 10x12.
8 Electric 20, 35, 50, 60, 100 & 150 H.P.

HAMMER MILLS

4 Jeffreys: 24x18-A, 36x24-B, 42x36-E & 42x48-B.
Williams No. 1 Jumbo Jr., & No. 6 Universal.
Nos. 4, 6 & 8 Williams Jumbo.
No. 36 Am. Ring Roll.
Gruendler No. 6X.

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72 Ton BLAW-KNOX 2 Compt.; also 250 ton.
100 Ton BLAW-KNOX 2 Compt.

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400 Bbl. Portable BUTLER Bulk Cement Bin with Fuller Full Automatic Electric Push Button Weigh Batcher.

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200 K.W. RIDGWAY 3/60/2200-250-275 v., 900 rpm.

DIESEL GENERATORS

240 K.W. F.M. 3/60/2300 v.
300 K.W. Worthington 3/60/2400 v.
125 K.W. F.M. 250 v. D.C.

RAYMOND MILL

5 Roll High Side.

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BELT: 1000 Ft. 60 In., 700 Ft. 42 In., 600 Ft. 36 In., 800 Ft. 30 In., 1642 Ft. 24 In., 517 Ft. 20 In., 297 Ft. 18 In., 1000 Ft. 14 In. & 16 In.
IDLERS: 36 In., 30 In., 24 In., 20 In., 18 In. Head & Tail—Pulleys—Takeup for all sizes.
Steel Frames: 2,000 Ft. 24 In., 30 In. & 36 In. Sections.

ROTARY DRYERS AND KILNS

36 In. x 20 Ft., 3 Ft. x 30 Ft., 4 Ft. x 30 Ft., 54 In. x 30 Ft., 42 In. x 24 Ft., 5 Ft. x 30 Ft., 5 Ft. x 16 Ft., 5 Ft. x 60 Ft., 6 Ft. x 60 Ft., 6 Ft. x 70 Ft., 70 In. x 40 Ft., 5x30 & 8x84 Double Shell Dryers, 8x110, 7½x100, 8x125 & 10x20 Kilns.

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STIFF LEG: 5 Ton 70 Ft. Boom, 15 Ton 100 Ft. Boom, 25 Ton 100 Ft. Boom, 75 Ton 135 Ft. Boom.

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DIESEL: 7—41½, 8 and 15 Ton 36 & 42 In. Ga.
GASOLINE: 3 Ton, 5 Ton, 8 Ton, 12, 14 & 30 Ton.
STEAM: 9 Ton, 20 Ton, 40 Ton, 60 Ton & 80 Ton.
ELECTRIC: 2 Ton, 5 Ton, 8 Ton, 17 Ton & 40 Ton.

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VIBRATING: 2x4, 3x6, 2x8, 3x8, 3x5, 4x5, 4x8, 4x10, 48x72. HUMMER, ROTEX, NIAGARA & ROBINS, LINK BELT & HURON.
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4 LINK-BELT A-60 In. Classifiers.
7 ALLEN Cones 4 Ft., 5 Ft., 6 Ft., 8 Ft.
30" Reciprocating Plate Feeder.

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12—50 Ton Cap. Battleship Gondolas.
7—50 Ton Cap. Flat Cars.

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1—1 yd. Electric 3—2 yd. 3 yd., & 4 yd. Electric

42 IN. BELT CONVEYOR

350 Ft. Barber-Greene Sectional Steel Frame Roller Bearing Belt Conveyor. New 1939.

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21 Worthington 169 Drifters.
12 Worthington 180 Drifters.
6 Gardner-Denver 15 Jackhammers.
45 Ingersoll-Rand Drifters S70, N75, X71, DA35.
11 Ingersoll-Rand S49 Jackhammers.

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125 Ton 56' x 10'6" Platform 4 Section.

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8 Gardner-Denver 3A & No. 6DS.

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1—48-Ton 0-6-0 Baldwin **Fireless** Loco. Built 1922. Good condition.

25-Ton 0-4-0 Davenport Loco., S. G. NEW FLUES. EXCELLENT CONDITION. Immediate Delivery.

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2—60-Ton 0-6-0 S/T Switching Locos. Coal-burners. Excellent condition.

3—70-Ton 0-6-0 Switchers, two with A.S.M.E. Boilers. Good condition.

SEND US YOUR INQUIRIES FOR ANY KIND OF LOCOMOTIVES

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36 years' experience

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"ANYTHING containing IRON or STEEL"

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DUMP CARS: Two Clark 30 cu. yd. capacity Air Dump Cars, good condition.

Smith 56-S Tilting Type Concrete Mixer, 2 cubic yard capacity, excellent condition.

Smith 28-S one cubic yard capacity Concrete Mixer, excellent condition.

Williams type P.C. material handling 1½ cubic yard capacity clamshell bucket, excellent condition.

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1—Rotary Kiln, 8' x 90'.

2—Ball Mills, 7' x 10', motor driven.
1—Gruendler Hammer Mill.
2—Steel Stacks 5'6" x 86' high.
2—Steel Buildings, 55' x 99', 40' x 54'.
2—Belt Conveyors 16" x 50' and 56'.
2—Jeffrey Bucket Elevators.
6—Gould Pyramid Pumps 2" to 4".
15—Wood Tanks from 5000 to 14000 gals.
Large quantity of corrugated sheeting, piping, shafting, Tanks, Pumps, etc.

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1—Chrysler Full Diesel Engine, 100 HP.
1—Rod Mill 5' x 10' approx., self-balancing type.
4—Concentrating Tables 25 to 40 ton capacity.
4—Trommel 36" x 36" Screens, new.
1—Allis Chalmers Rotary Screen 40" x 18'.
1—Jeffrey 24" x 24" Single Roll Crusher.
1—Ingersoll Rand Compressor ER-1, 14" x 12", belt driven.
4—Tyler Hummer, Sturtevant Vibrating Screens.
4—Williams, Gruendler Hammer Mills.

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One (1) Bucket elevator 32'-0" centers rigid type, with buckets 12x6x7¾" mounted on belt.
*One (1) Pitman assembly 10x36 for 10x36 jaw crusher.
*One (1) 15x36 Pitman assembly complete.
One (1) 20'-0" bucket elevator with buckets 10x6x 7¾" mounted on chain.
One (1) 30"x10'-0" double shaker screen.
One (1) 10x24 crusher.
One (1) 15x24 crusher—Timken bearings.
*One (1) 10x20 Pitman assembly—Timken bearings.
One (1) 4x10 single deck vibrator.
One (1) conveyor 24"x30'-0" with 4" dia. rolls and N. D. bearings. Inc. 5' head sec. 5' tail sec. and two (2) 10' inter. sec. Pulleys 12x26 as made on 6-25-105 anti-friction brgs. on head section.
One (1) #36 Plant FU310—10x24 jaw crusher, 26 x20 roll crusher, 3x10 2½ deck vibrator, 30' feed conveyor, mech. feeder. Plant equipped with mech. brakes, pneumatic tires, equalizer, and sand rejector.
One (1) 40"x16' scrubber.
Two (2) Quarry plants for 10x20 anti-friction brg. jaw crushers & folding type bucket elevators 12x6x7¾"x25' mounted on trucks with four steel wheels.
Two (2) 30 cu. yd. bins, 3 compartment with jack legs. 10 yd. each with lever operating slide gate valve 14"x14" ID of bin. 10'0"x16'0" height. 13'0" overall. Clearance under bin 7'2¼". Top section 10 ga. Lower section 3/16".
Six (6) steel wheels 40" dia x 10" F. to take 4" Hyatt bearings.
Four (4) steel wheels 44" dia. x 10" F. to take 4" Hyatt bearings.
Four (4) steel wheels 28" dia. x 4" F. 1¾" bore.
Six (6) steel wheels 28" dia. x 5" F. 1 15/16 bore.
Eight (8) steel wheels 24" dia. x 3½" F. 1⅝" bore.
Four (4) steel wheels 28" dia. x 14" F. 4" bore Hyatt.

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One (1) U-40 Allis-Chalmers gasoline power unit @ 36 cont. HP @ 1200 RPM.

*The above pitman assemblies can be installed in new bases and the complete machine can be sold.

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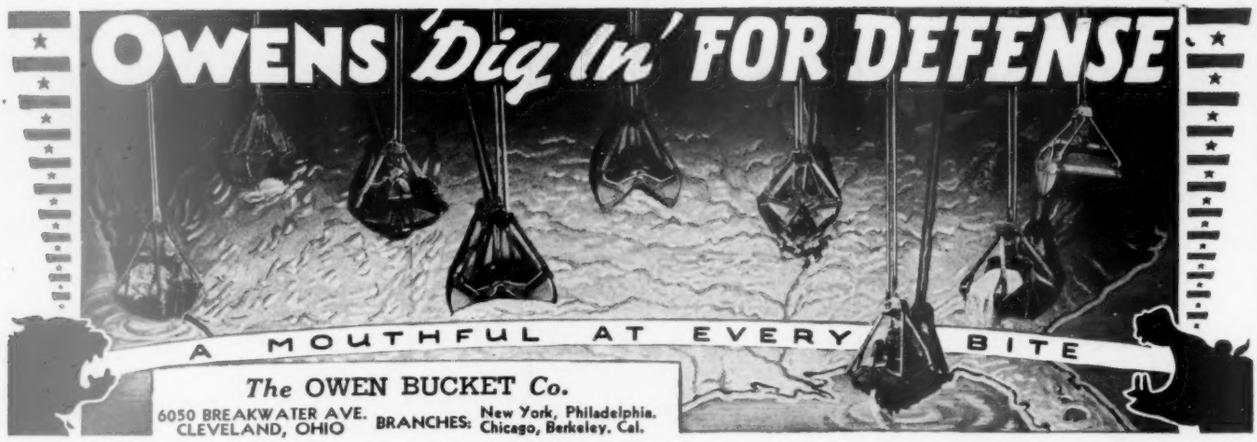
Minneapolis Minnesota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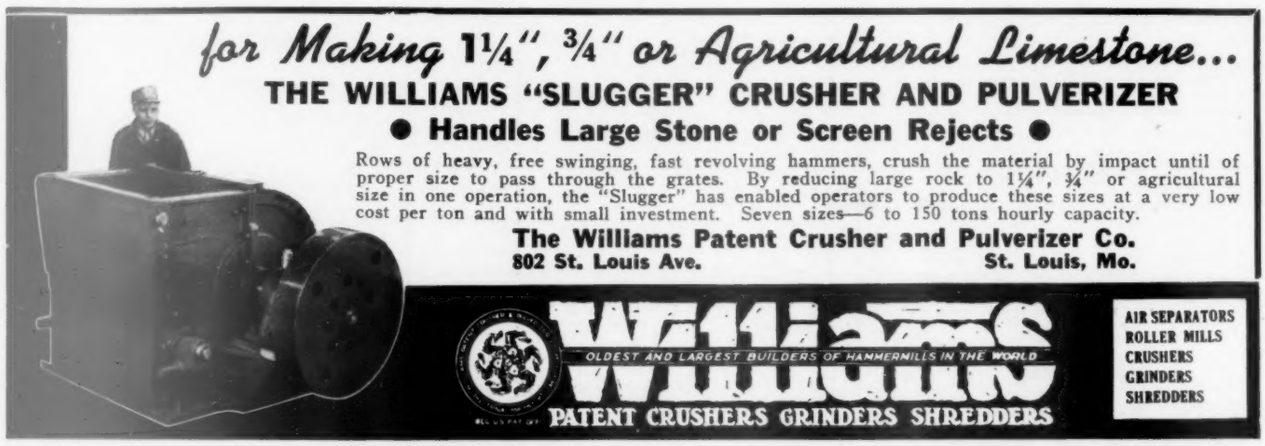
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● Handles Large Stone or Screen Rejects ●
Rows of heavy, free swinging, fast revolving hammers, crush the material by impact until of proper size to pass through the grates. By reducing large rock to 1¼", ¾" or agricultural size in one operation, the "Slugger" has enabled operators to produce these sizes at a very low cost per ton and with small investment. Seven sizes—6 to 150 tons hourly capacity.
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OLDEST AND LARGEST BUILDERS OF HAMMERMILLS IN THE WORLD
PATENT CRUSHERS GRINDERS SHREDDERS
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ESSENTIAL PRODUCTS . . . AMERICAN CABLE Wire Rope, TRU-STOP Emergency Brakes, TRU-LAY Control Cables, AMERICAN Chain, WEED Tire Chains, ACCO Malleable Iron Castings, CAMPBELL Cutting Machines, FORD Hoists and Trolleys, HAZARD Wire Rope, Yacht Rigging, Aircraft Control Cables, MANLEY Auto Service Equipment, OWEN Springs, PAGE Fence, Shaped Wire, Welding Wire, READING-PRATT & CADY Valves, READING Electric Steel Castings, WRIGHT Hoists, Cranes, Presses . . . *In Business for Your Safety*

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MINNESOTA - OPEN CUT WORK
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VIRGINIA - NEW RIVER ORDINANCE PLANT

From coast to coast, Construction and Quarry men are finding that Worthington Rock Drills and Air Tools use LESS AIR —that Worthington Portable Compressors deliver MORE AIR. It's a combination that is speeding their operations and lowering their costs. You, too, will find "More WORTH in a Worthington."

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These are the Features that put "More WORTH in a Worthington."

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DESIGN: Skilled, scientific designing results in low air consumption, high rate of penetration—and a tool that is easy on the operator.

QUALITY: Forged steel throughout, precision-made parts, and highest skilled workmanship guarantee ruggedness, long life and low maintenance.

SPECIAL FEATURES: In certain Drifters and Hand-Held Drills such exclusive Features as Independent Rotation, Pneumatic Feed and Hole Spotters result in lower cost per foot of rock drilled.

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Worthington Compressors are designed for HEAVY-DUTY, MODERATE SPEED service resulting in maximum overall performance with long life and low maintenance cost. These benefits result from—

- TWO STAGE AIR COOLING
- FEATHER VALVE
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- FORCE FEED LUBRICATION
- ENCLOSED CLUTCH
- SEALED CRANK CASE
- UNIT ASSEMBLY
- SIX-CYLINDER ENGINE
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- STRUCTURAL STEEL ALL-WELDED FRAME
- ROLLER BEARING WHEELS

WORTHINGTON

WORTHINGTON PUMP AND MACHINERY CORPORATION, HARRISON, N. J.

Address Inquiries to

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